da GAMA LOBO. (M.)

THE

Swamps and the Yellow Fever,

WITH

MEDIUM, MINIMUM and MAXIMUM

Thermometric, Barometric and Hygrometric

AND

DIRECTION OF WINDS

OF THE CITY OF RIO DE JANEIRO DURING

26 YEARS.

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Dr. MANOEL DA GAMA LOBO.

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TO H. M. THE EMPEROR OF BRAZIL,

DON PEDRO II.,

OFFERED

BY

HIS REVERENT SUBJECT,

Manoel da Gama Lobo.

Fig 1

Fig 2.

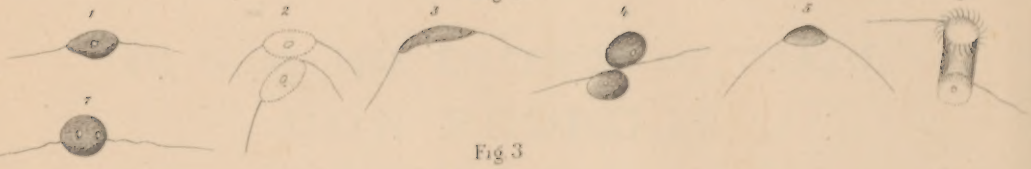

Fig 3

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Fig. 10.

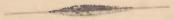

Fig. 11.

Fig. 12.

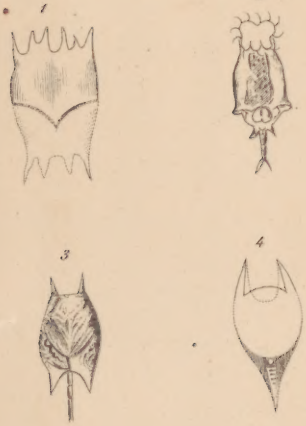

Fig. 13.

Fig. 14.

Fig. 15.

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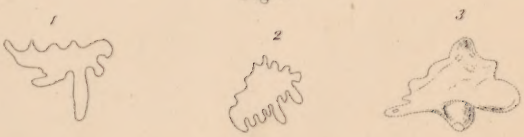


Fig. 1.—Arcellina hyalina. 1, generative cell. 2, Animal walking. 3, 4, Larvae. 5, Animal when eating.

Fig. 2.—(Text 1) Flagellata. 1, 7, animal swimming. 2, Larvae, 3, 4, 5, animal at rest. 6, animal when eating.

Fig. 3.—(Text 2) Flagellata. 1, 2, Larvae, 3, 4, 5, 6, animal when swimming. 7, animal when eating.

Fig. 4.—(Text 3) Flagellata. 1, 4, Larvae, 2, animal swimming, 3, animal when it is attached.

Fig. 5.—1, Salpina Spinigera, 2, (Text 4) Trachelina Lamella.

Fig. 6.—(Text 5) Cyclidium Glaucoma. 1, animaf at rest, 2, 3. animal walking, 4, animal dead.

Fig. 7.—(Text 6) Arcellina Vulgaris. 1, animal at rest, 2, 3, animal walking, 4, animal dead.

Fig. 8.—(Text 7) Pantotricum. 1, animal swimming, 2 eating, 3 the animal when scratching the leaves.

Fig. 9.—(Text 8) Navicula Gracilis.

Fig. 10.—(Text 9) C. Lineatum.

Fig. 11.—(Text 10) V. Campanula. 1, the animal when eating, 2, a group, 4, the skeleton.

Fig. 12.—(Text 11) Enteroplea Hidatina. 1, animal at rest, 2, eating, 3 swimming 4, dead.

Fig. 13.—(Text 12) Philodina Erytrophtalmos. 1, animal eating, 2, walking, 3, frozen, 4, dead.

Fig. 14.—(Text 13) Putnam Jacobus. 1, animal dead, 2, eating, 3, frozen.

Fig. 15.—Chritchett Bivalvular. This name I have given in honor of my eminente teacher and friend—the celebrated oculist of London.

Fig. 16.—Cyclops.

Fig. 17.—Amoebaea princeps. 3, the skeleton of animal Amoebaea in which I found the opening which was the mouth during life.

THE SWAMPS.

I divide the swamps into two classes. In the first class I place those which are constantly receiving brook-water and from which this water is constantly being discharged. In the second class I place those which receive only rain or infiltrated water and lose none except by evaporation. The changing of swamps from the second to the first class gives rise in almost every instance to terrible epidemics. The greater part of the Brazilian swamps belong to the first class; as those of Macacú, Belem and Sete Lagoas (Minas Geraes). Lagoa de Rodrigo de Freitas (Rio de Janeiro) and the swamps which surround this city, together with the New Jersey swamps, belong to the second class. I am acquainted at Rio de Janeiro with what is called the "Macacú fever" which was once a frightful epidemic (*Barão de Petropolis, Barão do Lavradio and Professor Torres Homem.*) The swamps of Macacú were formerly several leagues in extent and received the water of two brooks which flowed freely through them. In process of time alluvial deposits were made in the beds and at the mouths of these streams; clay banks were formed at the entrance of the brook of egress and the waters of the Macacú spread over the neigbouring country. The lands which produced cane and rice were sumerged and the farmers departed for other places beyond. Some years ago the farmers removed the obstructions from the mouths and heads of the streams, the water flowed back into its former channels and a great tract of land was exposed to the beams of a tropical sun. The animals and leaves of the plants which remained upon the soil decayed and the miasma from these putrefying bodies gave rise to a frightful epidemic which made hundreds of victims. This tract of land is to-day almost depopulated and the few inhabitants who remain have the colour of men who suffer from appilation. At present the swamps of Macacú are similar to what they were before the epidemics. During the prevalence of the "Macacú fever" quinine and arsenic were unavailing against it. (*B. do Petropolis, B. do Lavradia, History of Epidemics.*) I shall begin with the swamps of the second class and shall take as examples the swamps of New Jersey.

The Hudson River bathes the eastern shore of Jersey City, which lies opposite to New York city at 40° 41' Lat. N. The Hudson River forms in the low places of the city many swamps. The size varies from ten to some hundreds of metres and their depth from one to ten feet. The surface of the small ones is covered with little algae: that of the large ones with water lilies and a kind of tabuas. This alga is composed of a heart shaped leaf, roots and umbilical root. The reproduction of this plant is after the following manner:—When the leaf is viewed through the microscope, with object glass 4 the observer sees upon it one or two spots of a deep green colour and that the leaf in those places is thicker. As these spots of colour increase in size, one can see a body which extends from the centre of the leaf to its circumference. In a few days the leaf unfolds and at its circumference appears the new production which resembles a tongue placed between the lips. In a week the new alga goes out from the producer alga but remains attached to it by the umbilical root. This new alga has no roots till it has attained half its growth. The part of

the alga which produces the new plant become yellow. In this manner new algae grow surrounding the old alga. The surface of the leaves is covered with an epithelium composed of polygonal cell, which at its circumference have the parallopiped form; all are nuclei. The interior layer is composed of cells of chloro phyle and air cells. These are from 6 to $\frac{1}{4}$ of a millimitre in length. The root, when new, is composed of epithelial cells of a parallopiped form with great nuclei but without colour surrounding a row of green cells. The air cells exist only when the root is beginning to produce other roots. At that time they occupy the row which had been occupied by the chlorophyle (green matter) and we see three orders of cells. In the centre are the air cells which are surrounded by the cells of chlorophyle and these by colourless cells. The green cells pass through very curious phenomena during the segmentation of their green-matter. Let us examine a root with a row of green cells surrounded by a layer of colourless cells. Beginning at the extremity we see that the chlorophyle fills all the interior of the first and second cells and that it is homogeneous; in the third cell all the green matter is united in one compact substance which occupies the centre of the cell. The remainder of the cavity of the cell is colourless. In the fourth cell the green matter is divided into very minute segments like pollen, which pass on to occupy the interior surface of the fifth cell of which the centre remains colourless. In the sixth and seventh cells the green matter becomes granulated and begins to have the appearance of very minute cells which in the eight, ninth and tenth fill all the cavity of the cells. It is at this period that we see the brown pigment beginning to appear. One of the little cells grows rapidly and approaches the corner of the cell where it tears and thrusts away the wall. At this period thhe green matter is found to be transformed into a brownish matter from which passes out a white cell which is the beginning of the new root. The cells which do not produce roots nourish with their green matter the roots which grow above or below them and afterwards their interior is filled with air. Diagram:

1st. The green matter occupies all the interior of the cell.

2nd. The green matter occupies the centre of the cell and there becomes reduced to small grains.

3rd. The green matter leaves the centre of the cell and passes to the interior surface of the same cell having its centre transparent. Great cells appear in the green matter.

4th The cells and the green matter fill all the interior of the cell; the germinate cell grows near the corner of the primitive cell and this is penetrated by brown pigmentum.

5th. The distention of the epithelial tissue, rupture of the primitive cell and passing out from the brownish matter of the white cell.

The umbilical root comes forth from the interior of the alga at the same time as the new plant, which, after it is disengaged from the old is still united to it by the umbilical root. Its structure is the same as that of the root. I made the following experiments in order to ascertain the presence of air in the cells of the roots. I cut a root into fragments of different sizes which I placed upon a glass plate adding a drop of water. I carried the plate to a microscope having in it the object-glass 4. Afterward I took a stylet, and during the observation I rolled it over the root. When I rolled it towards the open end, I saw air bubbles coming out thence; and when I rolled it towards the root extremity, I saw the air distend the colourless epithelial cell giving to them a round form and at last break them and pass out air

bubbles. My experiments upon the umbilical root produced the same results. The extremity of the root resembles the end of the finger; its cells are colourless. Next to them come the green cells, and in the same row (at the side of the leaf) we find the air cells in the places previously occupied by the green cells.

The algae abound in the swamps of New Jersey during the summer at a temperature of from 85 to 95 Fa. It is during the same season and at the same temperature that the Brazilian algae flourish. As soon as the month of November comes they begin to disappear. All the infusoria, even those of the family *Bacillarum*, die at 80 b., and at two degrees above zero they lose the power of movement, but when the temperature rises to 15°6, they regain that power.

The intermittent fever of Rio de Janeiro, the Sezões of Pará, the malaria of United States and the Sagres fever of Panamá are the same disease; all originate from the marshes, but the *algida* and malignant fevers are caused by the marshes which contain rotten matter. I think that the best way to study the life of the animals and plants which live in swamps is by means of artificial swamps. I took a glass vessel and filled it with water from a swamp and every day I added more water to take the place of that which had evaporated during the preceding twenty-four hours. On the third day the water was clear and the matter which had been in suspension had descended to the bottom of the glass vessel. I was able to see that there are animals that live near the surface of the water and others that live at the bottom. The latter I had never seen before I employed the artificial swamp. I saw animals which in first period of their existence can only be seen with the microscope, but which afterwards are visible to the naked eye. Every leaf, after having produced four or five algae being no longer able to remain at the surface of the water sinks to the bottom. There is in each leaf only a small spot of green matter. This green matter is the origin of a new alga which grows and when its specific gravity has diminished rises to the surface of the water and there produces new algae. This is the reason why the swamps become covered with algae in so short a period of time. The animals which live at the bottom of the swamps eat the green matter which still exists in the leaf when it has reached the bottom. When we observe the artificial swamp in the morning at a temperature 12° c we see that its bottom is covered with fragments of the algae and that the space between the bottom and the surface is occupied by masses of green matter resembling columns, which extend from the bottom to the surface. But when a little space of the water is warmed by the beams of the sun, to effect which I employed a convergent glass (burning-glass) a great many bubbles of air are seen rising from the bottom to the surface. When the water is warmed and the leaves begin to pass upward, all the detritus is near the surface; but when night comes, and the temperature falls to 12°, the leaves and the detritus descend to the bottom. These facts explain the origin of the great bubbles of air which I have seen rising in the intertropical swamps, and the wonderfully rapid production of algae; the air bubbles coming from the parenchyma of the leaves where the great air-cells exist, and the algae from the green spots which grow at the bottom of the swamps.

THE INFUSORIA.

The infusoria which live in swamps have peculiar characteristics but these can only by observed when the animal is at rest, eating or swimming. The *Astasia* takes different forms; it is by turns star-shaped, round, pyramidal and spatulate. When it has assumed either of these forms we can see neither the mouth, the anus nor the long cilia which surround the mouth apparatus and the anus when the animal eats. The flagellum is used in swimming. Great confusion prevails in the flagellata. The same animal is placed in different families and different animals in the same family.

Fig. 1, *a.*—I found this animal at the city of Rio de Janeiro in 1879, in the brook which runs below the cemetery of S. João Baptista. This animal which Ehrenberg places in the *familia Bacillarium*, (*Art Quadrimaculatus*) must pass to the *Familia Flagellata.* It only acquires the power of motion when it has passed the first period, extracellular, and lives by itself. After these animals have left their cells, they remain in families during all the time which they pass under the state of larvæ. The way of formation is the following:—When the animal reaches the time of its transformation into cell, it searches for a leaf and here gathers itself up. It begins to lose its *flagelli* and can be seen with the cell divided by perpendicular lines. The space between two lines forms a chain of larvæ. These are not *flagelli* while they are divided into cells and when the cell is broken they come out from a chain of larvæ having only the two extremities *flagelli*. In proportion as they separate themselves from each other those that remain acquire the *flagelli*. The cut represents all the evolution of the animal during the three periods: the first intra-cellular, the second larvæ and the third when the animal has motion. When the animal is at rest it has the form of a half moon or that of two spheres united at their circumference. (*b*) This animal is composed of a cell and two *flagelli*, the anterior *flagellum* when fully extended is considerably longer than the body, it is carried quite fixed and straight, and the extremity alone performs vibratory movements. The most curious form of the animal is when it is eating. (*Fig. f*) we can see that it is tubular with long and short cilia surrounding its mouth apparatus and anus, it has a rotatory motion. One flagellum is near the mouth and the other near the anus. It has a large mouth, creates a whirlpool with its long cilia and takes its food with the short cilia, it eats living cells. Its long and short cilia are not seen when the animal is at rest nor when swimming. The mouth apparatus is situated in the middle of the cell and the anus near the flagellum in the same side of the cell. The division in two parts about which Butches speaks, I have never seen.

Monostomum, Bodo, Arthrodesmus Convergens of Bacillarium. Ehrenberg Die Infusionsthiere als vollkommene organismen, Leip. 1838. *Flagellata Spumella termo J. Clark. Ann. and Magaz. Nat. Hist. series 4th vol* 1856. *Astasia Trichofora.—J. Clark.*

Anisonema Concavum Clark.

Spumella, Cienkowski. Über Palmellaceen und einige flagellaten arch fur mik. An. 1871.

Peranema, Peranemata, Astasia, Pyronema, Anisonema, Heteronita, Dujardin. Hist. Nat. des Infusoiras.

Astasia trichofora Claparede, E'tudes sur les infusoires.

Heteronita crassa, Fromentel. E'tudes sur les microzadires. Paris.

Bütsches. On the Flagellata. Infusoria and Allied org. Quarterly Journal of microscopical science. London.

Stain's Organismus der Infusionsthiere.

Fig. 2, *a,a.*—This animal is placed by Ehrenberg in the *famil'a Bacillarum* while it is larva (Art. Quadricaudatus) and in the *familia Trochelinarum*, *g. tracketius*, *globulifera*, when it has acquired the power of motion. I found this animal at Rio de Janeiro in 1879 in the water which flows below the cemetery. It lives there in a temperature of 95° Far. at 22° 35' Lat. S., and here at 40° 30' Lat. N. in the same temperature during the summer. It is composed of two parts, the body and the flagellum; the body takes every imaginable form and is composed of a cell destitute of visible cilia; the flagellum is considerably longer than the body; it is carried quite fixed and straight and the extremity alone performs vibratory movements. The mouth apparatus and anus are well seen when the animal eats. When the animal is eating it takes a tubular form and we can see that the mouth is large and surrounded with long and short cilia bent at their extremities. The long cilia creates the whirlpool and the short takes the living cells whi h are swimming in the water. The anus is surrounded with long cilia. This animal eats cells of the size of $\frac{1}{1000}$ of millemeter and while it is eating is being constantly turned round by the motion of the flagellum. Its colour depends upon the colour of the cells. I have seen it star-shaped with a pretty emerald colour. Its body measures from 1 to $\frac{6}{1000}$ of a millimiter. The flagellum is used for swimming. The mouth apparatus is placed in the middle of the cell and the anus near to the flagellum at the same side with the mouth. The digestive tube extends to two hollows which are both placed on one side of the animal and which when they meet form a canal ending near the mouth. The cut represents all the evolutions of the animal during the three periods. The first intracellular, the second of the larva and the third when the animal has acquired motion and lives by itself without family.

Fig. 3.—This animal, placed by Ehrenberg in the *familia Bacillarum Arthrodesmusteutus*, must be transferred to the f. *Flagellata*. When the animal is mature it procures an old leaf and there passes through transformation. It takes a cellular form and its body is divided in two parts by a perpendicular line. The cell becomes a marine polypus (*polypier*) and when it breaks the animal (*larva*) is without the power of motion, and we see that the animals which remain among the fragments of the cell have a round form different from that of those which are on the outside. It is when the alone animal remains that it acquires the power of motion and takes varied forms. At *f* it is beginning to swim; at *g* it takes the form of a flower; at *h* it tosses about attached by its tail; at *i* it is walking; at *k* it is eating; and finally at *l* it is swimming with a rotatory motion. At this time (when it is eating and swimming) the mouth apparatus is surrounded with long cilia. The mouth which is large is surrounded with long and short cilia, the first serve to produce eddies and the second are used for taking the food. The long cilia which is half the length of the body is employed to carry the water and food to the mouth of the animal when the short cilia takes the food and introduces it into the mouth. The movements of the long cilia resemble those of the arms of a swimmer when some are extended, others are drawn towards the body and by these means whirlpools or eddies are produced. The anus is surrounded with long cilia; the food of this animal is round cells. The digestive tube extends to two hollows, which are placed one on each side of the animal and when they meet form a canal, which ends near the mouth.

Fig. 4.—This animal is classed in the *familia Bacillarum* when it lives as larva. Art. *quadricondatus*. Ehrenberg, and in the *familia Trachelina*, *Flamella*, *Fanatícula* and *Urdeptus lamella* when it is mature. This animal has three periods: the first intracellular, the second when it lives as larva without visible movements and goes where the current of the water takes it and the third after it is separated from the others and begins to live by itself. It takes different forms: sometimes it resembles a hand and sometimes a champagne bottle. It has a little flagellum at its extremity, and near the flagellum is the anus. Its mouth apparatus which has two slopes, is at the other extremity.

This animal eats living cells, and when it is swimming and eating the mouth apparatus is surrounded with cilia. F shows the animal when dead. I saw an animal attached to a root without having undergone a change of form. There is a broad white line which crosses the animal and divides it into two parts. On the upper side is the mouth and on the lower the flagellum; after the animal has undergone transformation the cell breaks and the larvae detach themselves from it to the number of eight or twelve. They live in families during the time that they are motionless; they have no eyes. The cut represents all the evolutions of the animal during the three periods.

Fig. 5.—This animal, *Cyclidium glaucoma, f. Bacillarum. Ehr.* when it has passed out of the generative cell is classed in the *genus Dorococcus, f. Monadinarum;* when it is mature and has the cellular form surrounded with long cilia in the *genus Xanthidium, H. hirtus pag.* 140, *f. Bac;* when it has a spatulate form in the *genus Cyclidium f. Cyclidinarum, pag.* 240; when the animal is dead it is classed in the *genus Actinophrys f. Enchelionum* with the name *Ac. sol, pag.* 240. We find the same animal in the *genus Pantotrichum* with the name *P. volvox, pag.* 248. Finally this animal is placed in the *genus Holophrina* with the name *H. Coleps, pag.* 315 When the time for its reproduction arrives the animal hides itself in the framework of a leaf. Its blue color contrasts with the yellow color of the leaf. The contents of the cell become granulate, and upon it appear lines which divide it into a polyzoon. The observer must constantly add water to the preparation in order to prevent its drying up Some hours after little cells of an emerald color are seen in the cell, and these acquire the power of motion before the cell breaks. When it is broken very minute animals (*Monads*) go out by the opening. Now and then one goes out and we see it swimming rapidly in the field of the microscope. Whilst those that are very near the opening are passing out, the others go towards the wall of the cell and come back to seek the opening. Afterwards these animals which resemble monads reunite themselves in a colony which has the appearance of an ant hill. This colonial life is not lasting, and after it the animal lives by itself. When the animal is at rest it has the round form; if it is swimming it has a round form with its circumference covered with long cilia. Sometimes it takes a spatulate form with all its body covered with short cilia. If the animal flees when the preparation is drying it takes the form of a Krupp bullet; at that time all the body of the animal is covered with little cilia, and its movements are so rapid that it is almost impossible to follow them. When it is swimming slowly it has the canoe or heart form. If it is eating and swimming it takes a tubular form with two openings the mouth and the arms, both surrounded with long and short cilia, the first to make whirlpools and the second to catch living cells. When the animal is dead it has the form (F) The animal swims turning upon its axis.

Fig. 6.—*Arcellina Vulgaris* This animal is a beautiful large round cell of a

brown color, with a transparent circular spot in the centre when viewed from the front, but if the observer looks at the circumference it resembles an Italian straw hat. When dead it has the appearance of two cymbals. It is extremely difficult to see the movements of this animal. It shows, when it is eating, prolongations at its mouth like those of the *amoeba*. It is enveloped in a cell which never changes its form and has two openings, the mouth and near it the anus. The digestive tube extends to two hollows which are placed on each side of the animal and when they meet form a canal which ends near the mouth. I found it in the "*Serra da Mantiquera*," *Seta Lagôas, Minas Geraes* (*Brazil*).

Fig. 7.– *Pantotricum Eucleliz genus Punt. familia Cyclidinarum.* This animal has different forms according as it is at rest, swimming or eating. When at rest it has six long cilia in front; these cilia are straight and directed forwards. At the posterior part there are also six cilia, and from the head to the anus, covering the back and the belly, one sees a row of cilia. But if the animal runs away one can see that its body is covered with short cilia. It takes the form of a shrimp when it is eating the green matter of a leaf; it seizes the leaf with the cilia, which is at the posterior part of the belly, and picks it to pieces with the anterior cilia in order to carry the cells to the mouth. If the animal eats while swimming it has the form of a water pot; long cilia surround a large mouth apparatus, and with them the animal produces whirlpools, and with the short cilia seizes its food. When the animal eats the observer can see the green cells pass from the mouth to the lower part of the digestive tube, and when it swims it has a rotary motion.

Fig. 8.—*Navicula Gracilsi, genus Navicula, familia Bacillarum.* This animal has a spatulate form when it is at rest, swimming or dead, but has a globular form when is eating. When it is at rest its color is yellow but when it is eating it is without color. When it is swimming and eating we can see long and very minute cilia surrounding its mouth apparatus. With its long cilia this animal creates whirlpools and with its short cilia catches the living cells. The digestive tube extends in a direct line from the mouth to the anus. The reproduction of this animal is by its division into segments; we can see horizontal and perpendicular lines.

Fig. 9.—*C. Lineatum, genus Closterium, f. Closterina, Ehrenbery.*

Fig. 10.— *V. Campanulla, genus Vorticella, f. Volvocina. Ehr.* This animal is composed of two parts, the body and the tail. When it is at rest it has the form of a water-pot, but when it is eating it is bell-shaped. In the first position the observer can see neither mouth nor cilia, but in the second a large mouth apparatus is visible with long and short cilia. The long cilia grows out of a membrane which exists at the labial commissures, having seven on each side. These cilia are used to create little whirlpools. The minute cilia surround the mouth and are used to catch the living cells which exist in the water. We see that the anterior part of the animal terminates in a brilliant ring from which unfolds a membrane which forms the mouth apparatus. This membrane and the long and short cilia are not seen when the animal is at rest. The tail is four or five times longer than the body of the animal. The mouth apparatus is placed on a triangular slope and the anus near it. The digestive tube follows the letters o o o f. When the animal is eating the tail is stretched out, but resembles a corkscrew when it is at rest. At the end of the tail we find a forceps which serves to maintain the animal in its position. It is very curious to see the animal fall backwards if anything touches its tail, and afterwards return to its former position. During this time it has a rotary motion upon its axis. With the immersion nine we can see the animal take with its short cilia a

living cell and introduce it into its mouth where it remains until another cell comes to push it into the digestive tube. The cells are forced down by pressure; finally in the lower part of the digestive tube they lose their color, and we see very minute bodies pass out through the anus, near the mouth. My observation lead me to believe that the reproduction of this animal is by a process of division into segments, after which the cell resembles a sporidium. This cell breaks, and the animals go out wriggling through the opening like ants. The length of the body is from 1 to $\frac{1}{12}$ of a millimetre. These animals live alone or in families, and I have found five in one group.

Fig. 11.—*Enterocephes Hudsonia, genus Enter f. Hyd. Ehrenberg.* This animal is covered with a membrane which encloses it, as it were, in a transparent tube. This *involucrum* (carapace) terminates at the interior part in ten processes and in a brilliant ring from which unfolds a membrane which forms the mouth apparatus, which is surrounded with long and short cilia. The former are used to produce whirlpools and the latter to catch the living cells. The *involucrum* has at its posterior extremity two processes. The animal has an articulated tail with a forceps which serves as a rudder when the animal swims and to maintain it its position when it eats. Sometimes it swims while eating with the forceps open. The anus is above the tail. The animal can draw in its tail when it is at rest. When it swims it has the form f., but its most curious form is when it is dead. Its reproduction is by division of the animal in polizoa after it has taken the cellular form. I think that all of these animals which have long and short cilia are destitute of eyes.

Fig. 12.—*Philodina Erythrophthalmus, genus Phil. f. Philod. Ehr.* This animal lives at the bottom of the swamps; it moves forward like the leech, attaching itself to the bottom by the mouth, it bends its body burying the forceps which is at the end of its tail to fix it near the mouth, afterwards it stretches out its body to continue its progress in the same manner. At this time it resembles a silkworm with a process upon its head; the extremity of this process has very minute cilia surrounding it. The animal has a strong forceps at the extremity of its tail. It is covered with a membraneous case (carapace), and it has in front two tubular processes when it is swimming and eating, and these are excessively broad and surrounded with long and short cilia, which serve to create whirlpools and take the food. The long cilia are bent at their extremity; the brilliancy of the tubular processes and of the cilia, together with the rapid movements of the cilia, give to the opening of the tubular processes the appearance of eyes. This animal has two mouth apparatus, and eats living cells which it catches in the water while the eddies are being produced with the long cilia; with its short cilia it takes the food. It has in its interior an apparatus, the movement of which resembles that of the arm of a lever; it draws the membrane upon which are the cilia into the interior of the tubular processes. I have never seen little animals of this kind, and cannot say what is the manner of its reproduction. The cut gives the animal eating, walking, freezing and dead.

Fig. 13.—*Potman Jacobus, nov. genus Potman f. Philodinaea.* This animal lives at the bottom of the swamps and hides itself under the detritus of the roots and leaves. It is very difficult to see it. This is enveloped in a carapace and has two horns in its forehead. The mouth apparatus is large and has fine and short cilia; it has a thick tail terminating in a forceps, and it feeds upon living cells. The digestive tube extends in a slightly curved line to the anus. The cut gives three

pictures of the animal—eating, freezing and dead. It has $\frac{5}{100}$ of length of a milimetre.

Fig. 14.—*Amoeba Princeps, f. amaeba.* I think that this animal catches its food with its tentacles like the *Arcellinas* and afterwards carries it to the mouth, which is a central orifice as we see in the fresh water polypus (*Hydra*). I think that its body is a hollow ; to verify it after I had studied the waters of Brazilian swamps, I sealed the glasses and brought them to New York, and here, six months ago, I decanted them ; and in the Residuum I found the skeletons of *Arcellina Vulgaris, Navicula Gracilis, Vorticella Campanula, Trachelina Lamella, Pantotricum Euclenis, Enteroplea Hidatina, Philodina Erythrophthalmus, Putman Jacobus and Amoeba Princeps.*

THE YELLOW FEVER.

The Yellow Fever is a disease of a continuous type produced by the Opunsia Mexicana, an animal which belongs to the family of Bacillarum. The Opunsia lives in the Jamapa River and in the Laguna de los Cocos. The Jamapa River supplies the City of Vera Cruz with fresh water and in the lake a stream has its source which at a place where it passes under the bridge of a road bordered with cocoa-nut trees, takes the name of Tanoia River. It afterward empties into the sea. The Laguna de los Cocos is 60 feet wide in the suburb of Vera Cruz, and from thence it extends to Medellin River. This lake or swamp is twelve miles in length, and is covered with aquatic plants like the lakes of the Amazonas River. The Jamapa River rises in the mountain and empties into the Gulf of Mexico some miles South of Vera Cruz. A steam machine takes the water and sends it through iron tubes to the city, where it is largely distributed, being fresh for the use of the houses and fountains.

This water is clear, and only a few roots can be seen in it with the naked eye, but with the aid of the microscope one finds a great many *infusoria*: Navicula, Flagellata, and Opunsia. The place where I found the Opunsia was a fountain surrounded by small cocoa trees near a house used formerly by Spanish officers, and very near the ruins of an old church by the side of a railroad. This fountain I was told received the water from the Jamapa River.

THE HISTORY OF THE OPUNSIA MEXICANA.

The existence of an oval cell characterized by a bright spot which refracted the light strongly found by me in the black vomit in the blood of the nasal hemorrhages and in the bilious vomit attracted my attention during the year 1873, when I began to study the pathological anatomy of the yellow fever, then prevalent in the city of Rio de Janeiro, according to the method I had learned from my eminent teacher, Professor Virchow. Further examination inclined me to the belief that this cell belonged to the vegetable kingdom and that it was the cause of the yellow fever.

In 1874 I sought for it in the blood which I took from patients, and I employed in my experiments the black vomit and the blood of the hemorrhages, with which I mixed alcohol and chromic and osmic acids. I had a funnel-shaped apparatus made after an English model, and in its wide extremity I placed a thin layer of cotton which had been dipped into alcohol, and in its narrow extremity a lamp. This apparatus was placed in an infirmary occupied only by yellow fever patients, where the lamp remained during one week. The apparatus was afterwards placed between the beds of two patients suffering from black vomit. These experiments were made in the City of Rio de Janeiro, and in the hospital of Jurujuba, which is on the opposite side of the bay. This hospital received only foreign sailors ill with yellow fever. I am much indebted to Dr. Pinto Netto, the physician of this hospital, for his kindness in facilitating my experiments there.

At the same time I studied the atmosphere of the swamps, receiving in cotton

the bodies that were in suspension in the air which crossed them, having for that purpose an apparatus in operation at a convenient point. During the day I examined also the waters of the swamps of Belem, Macacu and other swamps remarkable for breeding pestilence. During the yellow fever epidemics I dried the blood taken from patients putting it into bottles or drying it on rags. I visited the cities and villages where the yellow fever had made its appearence. I arranged statistics extending from 1851, the date of the first appearence of yellow fever at Rio de Janeiro, to 1876, taking the maximum, the medium, and the minimum of the barometrical, thermometrical and hygrometrical observations of each day together with the direction of the wind which each day blew. During the yellow fever epidemic of 1880 at Rio de Janeiro (January, February, March and April) I treated the black vomit and the blood of the hemorrhages with alcohol and with osmic und chromic acids; I filtered the black vomit, and the hemorrhages and afterward wrapped them in blotting paper. During the summer, I examined the water of the swamps of Jersey City, N. J., and in the winter I began my microscopic studies upon the black vomit and the blood of the hemorrhages which I had brought with me from Brazil.

I began my observations in the month of November of 1880 with the hemorrhages and black vomit which I had preserved from 1873 to 1879 and in them I found only the oval cells with one shining spot upon each. The black vomit and hemorrhages treated by the chromic acid showed oval cells, some of them segmented and others without the shining spot on each segment. Fig. 1, *a* cells; *i* the shining spot. I obtained the same result from those treated with the alcohol and osmic acid. The studies upon the black vomit and the hemorrhages of the months of February and March of 1880 I made in December of last year. Fig. 2, *A* the primitive cell segmented with two shining spots in its centre, with one at each of its extremities. The observer can see that the primitive cell was granulated. *B* the long cells were segmented but the segment were united by a transparent membrane. *C*, in these cells I saw the rupture of the membrane which connected the segments and these remained united only by some filaments. *D*, oval cells wrapped in a shining membrane which refracted the light strongly; *E* the oval cells with their shining spots in the centre and some of them granulated. *F*, fig. 3 *aa* primitive cells and their varied shapes, some transparent with one, two or three brilliant spots, others granulated and not segmented *B*. The dried hemorrhages and black vomit. Fig. 4, *aa*, transparent cells with one or two shining spots. *BB*, the segmented cells but with the segments united by the primitive membrane. *CC*, long and segmented cells with shining spots united with rods. Fig. 4, *g*, the typical shape of the Opunsia Mexicana. From this series of observations I arrived at the following conclusion: First, that the oval cell with its characteristic shining spots is the primitive cell which increased in length taking the shape *b*, fig. 5, that it became granulated and afterward segmented close to the shining spots, fig. 5, *c*. Secondly that the oval cell increased in length to form rods (*d*) and that these were the producers of the oval cells.

This method of development gave me the idea that the oval cell was an animal and not a vegetal as I at first thought. To seek for this animal I went to Memphis, New Orleans, Vera Cruz and Havana for the purpose of examining the waters, lakes and swamps and the salt water of the harbour of Vera Cruz and Havana and of comparing them with the water of the Texcoco lake, near the city of Mexico. Neither in the bayou of Memphis nor in the canals or swamps of New Orleans nor in the Pontechartrain and Texcoco lake nor in the salt waters

which bathes the shores of Vera Cruz and Havana did I find anything like the animal which I had found in hemorrhages and black vomit of yellow fever. In the month of January, 1881, when I examining the waters of fountains supplied by the Jamapa river I found in their sediments at first the uni, and bipolar cells and afterward the ribbon shaped rods and at last the animal adhering to the roots of aquatic plants and sediments.

For that purpose I employed the method that I had followed in the study of the *infusoria* of the swamps. Some time afterward I discovered the Opunsia in the swamp—*Laguna de los Cocos* at Vera Cruz, and in the Almendra river at Havana. I made use of the sediments and roots which swam in the surface of the water, taking them with an iridectomy forceps and placing them upon a glass. Afterwards I added to the preparation a drop of water, and I covered all with a cover glass, the preparation pressing with it. If a root occupied the field of the microscope I added several drops of water, and afterward with the point of a stylet I pressed the cover glass, and by the movement of a battering ram obtained a view of the terminal cell of the Opunsia and the ribbon, which, extending from the cell attached itself to the root or to the sediment. Sometimes I found a transparent ribbon which united some sediments to the root. These ribbons were the rods and the terminal cell which I found imprisoned in the sediment.

There is a matter that must be taken into consideration if the observer would see the ribbon which constitutes the extension of cell; he must adapt the microscope so as to obtain a view of something that is placed in a plane below that occupied by the cell and by the movements of the battering ram. It will thence be very easy to see distinctly one after the other the cell, the ribbon and the point of its insertion into some root or sediment. In the rods the shining spots are always to be found. The shape of the cell, its size and its contents when it is granulated give the idea of a corpuscle of blood, but colorless. In this case the extension of the cell is the sole distinguishing mark between them. The Opunsia Mexicana grows adhering to aquatic roots and sediments of water, and its increase is made by the extension of its staff, afterwards the shining spots appear, upon and near each spot is seen a brown line which divides the staff transversely into as many rods as there are shining spots. Afterward comes the granulation of the contents of the rods and of the terminal cell which becomes round. It is at this period that the buds which afterward become oval cells appear upon the surface of the rods. These detach themselves when they are grown, or remain united and transform themselves later into rods. Afterward the animal divides itself into segments, and the cell and rods produce new beings by the same process. The cell when not granulated is pear-shaped, its length being $\frac{1}{1000}$ its width $\frac{1}{1500}$. When granulated it is round and its length is $\frac{1}{1000}$. The length of the rod is from 6 to $\frac{1}{1000}$, and its width 1 to $\frac{1}{1000}$.

The yellow fever appeared for the first time in the city of Bahia [Brazil] situated in the thirteenth degree of south latitude, in the month of December, 1849, according to the following accounts. In the Tolerancia newspaper of the 17th of December, 1849, we read: "Egas Munis Carvalho de Campos pronounces the epidemic disease now raging in Bahia to be yellow fever." On the 13th of December news came to Rio de Janeiro that a disease was raging at Bahia called "Polka" or California fever. The news was brought by the steamer Pernambuco just arrived from Bahia. Afterwards the man-of-war Dom João I. came from Bahia with the report that the epidemic disease was on the increase. On the 20th of December the

steamer Imperador arrived, bringing the report of the Board of Health, dated the 12th of December, 1849. In its report the Board of Health expressed the belief that the disease was not contagious, and that it was produced by decomposition of animal and vegetable matter, caused by the extreme heat and copious rains. On the 19th of January the Board of Health declared the disease to be epidemic yellow fever, and sent to the government the following report:

"The fever which is to-day raging in the City of Bahia is considered by us to be yellow fever. The fever begins with a slight headache and pain in the abdominal regions, general weakness, elevation of the temperature of the body, diminution of the intellectual faculties, depression of spirits, scared face, and pain in the epigastric region which is relieved when the patient vomits. In some cases there is gastralgy. In the beginning of the disease the cheeks are red, the pulse full, but not hard, and the skin dry. If this state continues till the third day the pulse becomes lower, the tongue is white and covered with a saburral deposit, the light is painful to the eyes, the conjunctive enjected, and the patient suffers from horripilation. These symptoms disappear on the administration of purgatives and sudorifics. After the third day if the disease does not yield to treatment, epistaxis, bilious vomits, and yellowness of the face and thighs. If the vomiting is very frequent it comes mixed with black flakes like the dregs of wine. This symptom is more frequent in foreigners and children. The yellowness of skin increases every day, the supupration from blistering changes its hue, the urine becomes scant and is of a black or yellow color. The hemorrhages from the bowels and the echymosis upon the thighs appear; and if these continue till the seventh day death follows. With Brazilians the disease assumes the intermittent, malignant and remittent type, and benefit is derived from the administration of a great deal of sulphate of quinine. The Board of Health believes that the germ of the disease is carried to the animal economy by the act of breathing and that it then attacks the heart and *coronarius flexus* and the brain, perverts the nervous action and decomposes the blood, causing congestion of the brain and of other parts of the system. This disease develops itself during the day as well as during the night. The Board of Health thinks: 1st. —That the disease is the yellow fever. 2d.—That it is not a contagious disease. Bahia, January 19th, 1850.

Vicente Ferreira de Magalhaes,
Salustiano Ferreira Souto.
Luiz Maria Alves Falcao Munis Barreto, *Secretary.*

Diario of Rio, February 8th, 1850." *Pereira Rego. Hist. of Epi.*

THE YELLOW FEVER AT THE CITY OF RIO DE JANEIRO.

Dr. Lallemand in a communication to the Imperial Academy of Medicine of Rio de Janeiro reported eight yellow fever patients treated by him; two were sailors who had come from Bahia in the American ship Navarra; they were received at the Misericordia Hospital on the 27th of January, 1850. The others, four in number, were persons who lived with the two sailors in Misericordia street at a tavern kept by a Mr. Frank. Of these four one was the wife of Frank, and another his cashier. Dr. Sigaud reported the case of a young Frenchman, named Eugene Ancean, who arrived from Bahia only ten days before, and who died of yellow fever. Dr. Feital

also reported the case of a Brazilian sailor who arrived from Bahia by the steamer Dom Pedro suffering from yellow fever, and who died within four hours after his arrival. The Academy did not on this occasion express an opinion as to whether the disease was or was not yellow fever. In February of 1850 the Academy reassembled and sent a report to the Government that the disease then raging in Rio de Janeiro was yellow fever." (*Annaes Brasilienses*). The yellow fever was imported from Bahia to the city of Rio de Janeiro by sailors and passengers, some of whom went to the hospital where they died; others spread the disease where they lived. The yellow fever in this year spread through all the northern coast of Brazil as far as Pará (2° Lat. S.) in the epidemic form, "and ravages all villages and towns that had communication with the epidemic focus."—Dr. Malcher of Pará. In the following years the yellow fever having Rio de Janeiro as a focus spread itself over the southern coast of Brazil as far as Buenos Ayres and Montevideo (35° Lat. S.). "After the epidemic yellow fever of 1850 it appeared every year in a sporadic form till 1859, a period at which it disappeared to appear again in the years '71, '72 and '73." (*Dr. Castro of Pará*).

Before 1849 there is no authentic information that can establish the presence of yellow fever on the Brazilian coasts. The disease was not brought from Africa, for, in that case it would have prevailed during the period of the importation of slaves, and not after it when Brazil had no longer any business relations with Africa.

Of the history of the importation of the yellow fever to the City of Bahia we find an account in the thesis of Desembargador Japiassu (1854). At present the yellow fever is endemic in the City of Rio de Janeiro taking from time to time the epidemic form. When the disease is epidemic it spreads to the City of Santos and other places around it carried by steamer or by rail. In the beginning yellow fever was limited to the coasts; "afterwards the disease was transmitted by the Santos railroad to the City of Campinas situated on the fertile land of São Paulo 1,300 feet above the level of the sea, but without creating a focus of infection." (*Annaes Brasilienses*). In 1880 the yellow fever spread to the village of Porto Novo do Cunha, the termination of the Dom Pedro II. railroad, 288 kilometers from Rio de Janeiro. The germ of the yellow fever ascended the Serra do Mar mountains, 2,400 feet in height, carried by the railroad, descended to the plains and developed itself at Porto Novo do Cunha on the Parahyba river (600 feet above the level of the sea). Dr. Hermetto Leão called the attention of the government to this matter (L. Cony). It was during the Brazilian summer (January, February, March and April) that the yellow fever made its appearance in the City of Rio de Janeiro; "before its appearance we have always found gastrals" (Dr. Pereira Portugal, Book of his Infirmary). "The shores of Saude where the ships and merchant steamers are anchored is the place where the yellow fever originates" (Dr. C. d'Azevedo). My observations confirm this opinion. The only time it appeared in the Rua Formosa was in a patient who lived at No. 39. He was a workman employed in unloading vessels on the Saude wharves. The man died and the disease spread over the town. His physician was Dr. Peixoto.

After the yellow fever epidemic of 1850, which was the worst of all, the disease took a less dangerous character, as we see by the following table:

YEARS.	DEATHS.	YEARS.	DEATHS.	YEARS.	DEATHS.
1851	475	1860	1,182	1869	247
1852	1,943	1861	239	1870	1,002
1853	853	1862	11	1871	5
1854	21	1863	12	1872	8
1855	3	1864	7	1873	3,337
1856	157	1865	0	1874	814
1857	1,500	1866	2	1875	1,166
1858	1,166	1867	3	1876	3,274
1859	508	1868	4	1877	—

Paula Candido, the last President of the Board of Health of Brazil, wrote a valuable paper upon the yellow fever of the years 1851, '52 and '53, which was published in 1854. He wrote as follows: "The exciting cause being present in an atmosphere saturated with gases and exhalations these substances unfold and are transformed into those which produce yellow fever, which effect is favored by the fact that in the beginning of the year 1850 the burning winds of the northern quadrant prevailed to the almost entire exclusion of the breeze and with diminution of the S. E. wind." (*P. Candido*) My own experience confirms this opinion in regard to the winds. For 1851 the S. E. wind blew during the year 332, the N. W. 241 and the N. E. 38 times. In the year of the greatest mortality (1878) when the number of deaths was 3,337, the S. E. and the S. winds blew 351 times, the N. W. 321, the N. E. 57 and the N. 19. In 1876 the S. E. blew 76 times, the N. W. 303, the N. 41, the S. S. E. 243, the S. S. W. 30 and the S. W. 18. In the year 1866, in which there were but two deaths, the breeze blew 315 times. What we have verified by statistics is that the S. E. has been the wind most frequent in the City of Rio de Janeiro, with the exception of the year 1876. After this comes comes the N. W. the morning wind as the S. E. is the evening wind. Hygrometric and barometric observations show the most humidity and greatest atmospheric pressure in the months of January, February and March. "The curved lines show that the mortality is in direct ratio with the humidity, the inverse of the pressure of the air." (*P. Candido*). If we take as base the months and compare them together this opinion is correct; but if we compare the months of the greatest mortality day by day, it is faulty.

On the first appearance of yellow fever fewer negroes were attacked than white men. The opposite of this I found to be the case during the cholera morbus epidemic. Next came exemption from those who lived in places where the yellow fever was endemic but foreigners, and Brazilians who live in the interior are equally liable to be attacked when they come to Rio de Janeiro during the summer season, that at which yellow fever is apt to appear. Persons who live in the cities where the yellow fever rages can leave their homes for three, five or six years, and return at the end of that period without danger of contracting the disease, and those who have had it are as little liable to a second attack as is a person who has been vaccinated to contract small pox. During the great epidemics some who live in the endemic centres may be mortally attacked by the disease if they are not careful as regards their diet. In Brazil the yellow fever has a certain limitation of locality above which it has not risen as an epidemic. This limitation is 800 feet above the level of the sea (*Study on the Yellow Fever* 1873, '74, *Dr. Gama Lobo*). In Mexico the height is 1,008 metres (3,204 feet) at the village of Pueblo de las Animas, situated between Cordoba and Orizaba. (*Heineman*). Observation has shown me that yellow fever can ascend to the height of 2,500 feet without spreading at the stations situated

on the mountains above 800 feet, and descend to the plain to develop itself at Porto Novo do Cunha upon the bank of the Parahyba River. The temperature most apt to develop yellow fever at Rio de Janeiro is from 80° to 96° Far.; its decrease begins at 70° Far., and it disappears at 60° Far.

In the City of Pará the heavy rains and the saturation of the atmosphere with electricity during the "equatorial winter," as the rainy season is called, are the causes which seem to contribute to the extinction of the yellow fever (*Dr. Cayper of Pará*). This was also the rule in Vera Cruz, but in the latter part of the year 1880 and in the beginning of '81 I saw patients die of yellow fever when the temperature was 54° Far. and a strong north wind was blowing. In Rio de Janeiro the yellow fever never continues through the winter. The opposite of this was the case in Vera Cruz in 1867 and '68, and in 1877 and '78 (*Heinemann*, and in 1880 and '81 as I myself saw. It is a very singular fact in regard to Rio de Janeiro and Vera Cruz that persons who come from foreign countries can pass through these cities when the yellow fever rages as an epidemic and remain for sixteen hours and leave, or persons from the interior can do the same without catching the disease. I have seen in Rio de Janeiro a great many colonists arrive from Europe and walk or ride across the city to take the railroad to Pirahy, a little town beyond the Serra do Mar mountains, and also English and American gentlemen with their wives arrive from New York and Montreal, remain in the City of Vera Cruz for seventeen hours, walk through the streets and public square and afterwerds take the railroad without suffering any inconvenience. Time and a sufficient quantity of the germ to which my experiments lead me to attribute this disease are requisite for its development.

The City of Pará, like that of New Orleans, is surrounded by streams and swamps. It is situated upon low ground. On the north lies the Bay of Guajara which is formed by the Guamá, Acará and Tocantins Rivers, on the west the Guamá River; and the city extends south and east over a surface full of small hills interspersed with swamps. This city, which contains 45 000 inhabitants, is about 140 miles from the Amazon River, but the Guajara Bay is connected with the Amazon by the Canal of Tajipuru. Besides its unrivalled rivers, its lakes covered with lilies and other flowers, its primeval forests, its islands filled with palm trees, its birds of variegated plumage, its insects, fishes and animals of various kinds there is no attraction in the province of Pará. The inhabitants of the City of Pará drink well water, the streets of the city are unpaved and its houses have no sewers. All in that lovely land is wonderful in beauty, but the male inhabitants spend their lives in ill judged and senseless political agitations. In all Brazil life is shortest at Pará; its inhabitants become prematurely old. The intermittent fever and congestion of the liver and spleen are prevalent diseases. The malarial fever (*sezoes*) is endemic in the valley of the Amazon. If it were not for the rains which fall in torrents every day during the tropical winter, the electricity which lights the heavens almost every evening and the millions of animals which eat the yellow fever germ, as the *cuthellia* eats the monads of the *spirochæta*, the City of Pará would be a second Vera Cruz.

The City of Pernambuco (Recife) is situated in the eighth degree of south latitude upon the sandy shores at the mouth of the Beberibe River. This river divides the city into two parts. Pernambuco is, next to Rio de Janeiro, the prettiest city of Brazil. Its streets are handsome but the greater part of them are narrow. It is abundantly provided with fresh water and sewers. Pernambuco is the great emporium for sugar cane. The yellow fever appeared here in the early part of the year 1850 when it was imported from Bahia. To day the sporadic or epidemic type of

the disease prevails during the summer. My belief is that the yellow fever is not endemic at Pernambuco.

BAHIA.

Bahia is situated in the thirteenth degree of south latitude upon the Bay of the same name. The city is divided into two parts. One is built upon a mountain, the other upon the shore. Pahia is remarkable for the lack of cleanliness of its streets which are very narrow. There are several squares in the city the finest of which is the Passcio Publico. The Board of Health of Bahia is a Sphinx which has eyes but see nothing. The men of Bahia are great poets and orators, and the most intelligent in Brazil ; they are excellent theorists but fail to comprehend the problems of life. It is my own belief that the *vatapa* develops intelligence as to abstract things but enfeebles it as to those upon which depend the material progress of a nation. That part of the city which is built upon the mountain is handsome and provided with an abundance of fresh water and good sewers. It was in Bahia that the yellow fever appeared for the first time in Brazil (1849) (*See the Theses of Desembargador Japiassu upon the importation of the yellow fever and its development at Bahia*, 1851). In 1854 the cholera morbus ravaged the City of Bahia and the surrounding villages. Unhappily Bahia is like the City of Havana where the yellow fever is endemic. There as well as in Havana the yellow fever germ has found a lovely country in which to take up its abode. The type of the yellow fever at Bahia does not differ from that of the other Brazilian cities ; it appears during the summer and disappears during the rainy season ; sometimes having a sporadic character, and again with the epidemic type.

SÃO PAULO.

The City of Santos which contains four thousand inhabitants, is situated in the twenty fourth degree of south latitude upon a clayey soil between the Atlantic Ocean and a high mountain range having on the north marshes, on the west and south the Serra do Mar mountains and on the east the sea. Santos is one of the finest ports of the Brazilian coast and is destined to become, after Rio de Janeiro, the chief emporium for Brazilian coffee. It is but a few years since it began to be an important commercial port, Rio de Janeiro having formerly been the coffee market of Brazil. The City of Santos is the seaport of the progressive province of São Paulo, the land of coffee and iron. The yellow fever first appeared here in 1850, and to-day whenever the disease develops itself at Rio de Janeiro it is carried to Santos by the coast steamers. On the arrival of the steamers at Santos the first persons attacked are their crews or passengers and afterward the inmates of the houses where these persons take up their residence, these houses becoming a focus for the spreading of the disease.

My belief is that the opunsia requires time and a suitable temperature for its development. The proof of this is that cities where the yellow fever is raging can be crossed with impunity by travelers while this animal is living in the water which they drink—and which serves for the use of the inhabitants—and in the air which they breathe. That the cells exist in the air is proved by the following facts : The greater liability to contract the disease during the night, and its importation in vessels and merchandise.

" In the first period of the yellow fever the pulse rises to 118 ; the thermometer marks 41°,5; the breathing descends according to the seriousness of the attack, and

the quantity of urine is a few ounces only. In the second period, that of the black vomit, the pulse descends from 118 to 48, the breathing becomes more rapid; the thermometer placed under the armpit marks 37°, 38°, the urine becomes scant or ceases altogether; the heat of the extremities diminishes and the patient appears restless; finds no position comfortable, leaves his bed, rolls on the ground, seeks for air, asks for cooling drinks, feels a pressure in the region of the stomach and a desire to vomit. At times he appears to be delirious, rushes to the windows, and runs about the room. These strange symptoms are the precursors of hemorrhage. Sometimes the patients die after having fallen into a comatose state. There are cases still more serious where the hemorrhage declares itself at the nose. At the sight of the blood, which flows without ceasing, fear takes possession of the patient, and in spite of use being made of all known remedies including plugging, he dies, owing to the powerlessness of all remedies."—(*Gomes Lobo, Yellow Fever at* 1873, '74, Rio de Janeiro). The urine employed was that of a patient with whom the temperature of the skin was 41° and the pulse 65. The suppression had existed 56 hours, and the first urine emitted was used in the analysis. The microscopic examination showed a prodigious quantity of vibrious epithelial cells, many chrystals of uric acid, of ammoniacal magnesian phosphate and globules of blood. There was no glucose for, submitted to a solution of sub acetate of lead, and put in contact with Fehling's liquor, there was no reduction of this liquid. The negative condition was further indicated by the polariscope of Biot. By the method of Leconte for the discovery and valuation of the quantity of the urea, it was found to contain in the proportion of 27,9 grammes *per litre.*

The density of the urine was 1,016
1 litre gave weight of solid substances.....52 grammes.
1 litre contained: Albumen..... 4 gr. 2 dec.
Urea.....32 gr. 3 dec.

The pathological anatomy shows the stomach to be pierced by ulcerations more or less large and deep. Brought to the light, hemorrhagic spots of different sizes are to be seen, from the size of a pin's head up to one or more centimeters in extent. Adhesive pleurisies, pneumonias, meningitis and parenchymatous and hemorrhagic nephrites, &c., accompany this form of the disease. In the bilious form of the yellow fever the parotid glands present a suppurative character, and abscesses are formed in different parts of the body."—(*Dr. Gomes Lobo op.*) The liver, examined two hours after death, exhibited fatty degeneration in its cells, and the heart and *crossa* of the *aorta* similarly affected.

I found fatty degeneration in its different periods. 1st. in the vessels which start from the meninges and are distributed in the encephalic mass; 2d, in the capillaries of the encephalon itself; 3d, in those met with in the cerebral mass. The examination of the diseased mass was next made, employing a power of from 400 to 800, and it was found that the cells had suffered from fatty degeneration.

TREATMENT OF THE YELLOW FEVER.

The treatment of the yellow fever in Rio de Janeiro may be divided in two periods, the first began in 1850 and was introduced by Professor Valladão, the second began in 1872 and was introduced by Pereira Rego. In the first period the treatment commenced with the administration of a sudorific potion; after the sweat one or two ounces of castor oil were given to the patient, and when the purgative effects had disappeared sulphate of quinine was employed. During the black vomit fluid magnesia was administered to the patient and blisters applied to

the stomach. In the second treatment sulphate of quinine was prescribed. In 1871 Dr. Castro of Pará began to employ lemon juice in the first stages of yellow fever in doses of one ounce mixed with tincture of aconite in an infusion of chamomile. It has been found that this treatment has been made use of in Vera Cruz, New Orleans and Havana. It constitutes the treatment in common use, its sanction being the custom of more than a century. I used in the second period of the yellow fever arsenic and port wine. My experiments on the *infusoria* taught me that oil kills all *infusoria* at once. It is easy to verify this by adding one drop of oil to the microscopical preparation. The treatment by sudorifics and oils is rational.

MEMPHIS.

The City of Memphis, containing from 35 to 40,000 inhabitants, is situated in the thirty third degree of north latitude, and upon the left bank of the Mississippi River. It is about sixty feet above the level of the river at ebb of tide. Its streets are clean and wide and its houses provided with an abundance of fresh water and good sewers. The Bayou Gayoso (a brook) divides the city into two parts and formerly served as the receptacle for the foul waters of a portion of the city, the other portion using *latrines*. After the yellow fever epidemics of the years 1878 and '79 the city remained depopulated and the Governor of Tennessee appointed the Hon. Dr. D. T. Porter President of the Fire Department and Police Commissioner. It is owing to this good citizen that the City of Memphis has now the best system of sewerage in the United States. Dr. Porter showed me the manner in which the sewers are voided and the current of their waters which flow at the rate of two miles an hour and the nature of the openings through which the common sewer communicates with the atmosphere, and I saw that all was well finished. No bad odor came from the interior of the sewers and the waters which ran into the common sewer were transparent until they reached the place where they rushed into the Mississippi River. I met at Memphis with a courteous reception from Drs. Porter and Thornton to whom I had been introduced by the Hon. Mr Savigne, the French consul. I examined the waters of the Bayou Gayoso and those of the sewers. The Mississippi River was at the time covered with a layer of ice. I will quote from the "First Annual Report of the Board of Health of the year 1880" (Dr. Thornton) the note upon the development of the yellow fever of the year 1879 :

THE EPIDEMIC OF 1879.

From official records the first case of yellow fever occurred July 8th, though from some facts which developed subsequently I am satisfied the disease existed here anterior to that date. The important question arises, whether this case or the first cases were from influences of the epidemic of 1878, or from importation. I assume that the disease arose from the poison of the preceding year, which remained dormant, or at least inactive, until it was developed under favorable atmospheric conditions. It is unnecessary to give my reasons for this opinion here.*

The first death occurred in the evening of July 9th, and on the morning of the 10th a number of suspicious cases (three of which proved to be genuine) and two deaths, which occurred on the night of the 9th, were reported at the Health office. These six cases were in three distinct localities of the city. The first in the Sixth ward, at No. 204 De Soto street; three at one house in the Tenth ward, No. 425 Wellington street, both in South Memphis; and two at one house in the Eighth

*NOTE.—For this opinion as against the importation theory see paper read by myself on "The Epidemic of 1879," before the Public Health Association in Nashville in November, 1879.

ward, at No. 55 Bradford street, in the north eastern portion of the city, about a mile on a direct line from either of the other two localities. Three deaths occurred within twenty four hours of each other at the three places named, consequently they must have contracted the disease about the same time, but there is no evidence to prove that they contracted it from the same source. I am strengthened in this opinion from the occurrence of cases subsequent to these which were attacked under similar circumstances, and could not be traced to the influence of direct communication. The disease appearing as it did at *four* known points (and perhaps others), in thickly populated neighborhoods, in different portions of the city at or about the same time, among people susceptible to its influences, in an atmosphere favorable to its spread, it was impossible, with the facilities then at command for enforced isolation of cases and houses, to do more than was done to prevent its spread.

Assuming that the disease *had been* and was reproduced from the poison of the preceding epidemic, and was what was popularly termed *sporadic yellow fever*, I must confess somewhat to a delusion, in which, however, my professional brethren participated, that the disease under these circumstances is so modified as to lose its specific character, and will not reproduce itself. However, as soon as the disease was recognized, all available means of disinfection and isolation were practiced. In this work the Board had the co operation of the National and State Boards of Health through their respective resident members, Dr. R. W. Mitchell, of the former, and Hon. John Johnson, of the latter. But these Boards being new, as well as this one, there was not a proper appreciation at first as to the relative status of one toward the other, nor the extent to which one Board could call on the other, while there was a perfect harmony and willingness to co-operate individually. When it became apparent that there was a strong probability of the disease preading, as it did, under the circumstances rapid depopulation seemed to be the most effective way of preventing a repetition of the epidemic of 1878, and this was urged as positively as possible. But while depopulation was decided on by all parties interested in arresting the disease, no available means were spared and every effort was exerted toward disinfection and isolation. On the contrary, these means were multiplied as the facilities for practicing them could be increased, and for nearly a month the disease seemed, with the exception of a few cases, to be confined to the neighborhoods where it first appeared, which encouraged the hope that there would be no general epidemic, and it was not until August 10th that formal announcement of the epidemic was made.

DEATH RATE PER 1000 POPULATION.

Estimated at 40,000—*One-Third Colored.*

Years.	Total Deaths.		Proportion to Population.		Proportion to Total Population.		Total Pop'lat'n
	White.	Colored.	White.	Colored.	White.	Colored.	W & C'd
1874.....	643	546	24.1	40.9	16.1	13.5	29.7
1875.....	681	584	25.5	43.0	17.0	14.6	30.2
1876.....	666	612	25.0	45.1	16.6	15.3	31.9
1877.....	661	612	24.8	45.1	16.5	15.3	31.8
1878*.....	2438	1523	92.0	114.2	60.9	38.1	99.0
1879*.....	818	755	30.6	56.6	20.4	18.9	39.3

* Epidemic years.

The table is compiled from the official records of the Health office, based upon a population of forty thousand, which was the estimate in 1870, as shown in the National census of that year; also by the City Directory of the past year, and as adopted by Hon. John Johnson of the State Board of Health.

It makes the death rate lower than reported by the National Board of Health, but that report was based on a population of 30,659, which I think is too low.

NEW ORLEANS.

The City of New Orleans with its 220,000 souls is situated in the thirtieth degree of north latitude. It is bounded on the north by the swamps which separate it from the Lake Pontchartrain; on the east by swamps which are a continuation of those on the north and by the Mississippi River, and on the south and west by the Mississippi River. Built upon low ground on a clayey soil and surrounded by river, lake and swamps. New Orleans is a very damp city, a protection line of leeves and canals on the east and west beyond the embankments along the river side being necessary for its preservation to a certain extent from humidity. The city has four canals from eight to twelve metres in width, which serve to receive rain water of the four districts into which the city is divided. At the extremity of each is placed a draining machine to force the water of the canals into the lake. These machines are usually at work only twice a week, but in rainy weather they are in operation day and night, six days being sometimes necessary to void the water of the canals New Orleans has handsome avenues and streets but the pavements are bad. Unfortunately, there is a deplorable lack of cleanliness. The inhabitants drink the water of the Mississippi which is brought to the city by powerful machines. This water when filtered is excellent but in its natural condition it must stand three days before becoming clear as it contain 65 % of clay. New Orleans has no sewers but employs *latrines*. One hundred and forty miles distant from the Gulf of Mexico this city is necessarily exposed to yellow fever from Havana and Vera Cruz where the disease is endemic. Dr Faget, who has resided in New Orleans for the past thirty years shares my own opinion as to this question.

Dr. Faget thinks that the mean temperature of patients suffering from the yellow fever is 40° c. This is the general rule in Rio de Janeiro but during the epidemics of 1873 and '74 I saw the temperature rise there to 41° 5c.; the same degree has been observed also in Barbadoes and Memphis. In New Orleans the mean time of duration of the yellow fever is seven days (*Dr. Faget*); in Rio de Janeiro it is six (*Dr. Maruda*) A very important fact results from the comparison of the temperature of the patient's skin with the pulse.

When we compare the rates of temperature furnished by the yellow fever patients treated at New Orleans and Memphis we see that they are almost similar. The parallel holds good when these rate are compared with those of Rio de Janeiro. The rate of temperature during the yellow fever rises rapidly to the highest degree, then descends almost in a parallel with the rate of the pulse and finally becomes the same. If the disease ends in recovery these rates remain equal, but if it terminates fatally we see "that the rate of the pulse rises and that of the temperature descends" (*Dr. Faget*). In observations made during the yellow fever epidemics I also found this to be the general rule, but in some patients while the rate of the temperature remained the same, the rate of the pulse decreased rapidly.

Dr. Faget in speaking of the continuous type of the yellow fever say:

1° *Type continu de la fièvre jaune.*—Le premier fait qui ressort de l'examen des 103 *tracé linéaires* relevés á New-Orléans et à Memphis, c'est que la fièvre jaune, dans ces deux villes, n'a eu qu'*un seul paroxysme* et qu'ainsi elle appartient à la

classe des continues, pour s'en assurer, il suffit de les parcourir attentivement. Nous n'aurions que cette centaine de tracés que nous nous prononcerions hardiment. Mais déjà, dans une brochure publiée en 1859, nous nous basions sur les chiffres du pouls d'une centaine d'observations pour établir certaines propositions, et de ces observations ressortait aussi la preuve de la continuité du mouvement pyrétique dans la "fièvre jaune." Depuis, j'ai trouvé dans une brochure de Blair intitulée "Some account of the last Yellow Fever epidemic of Guiana, 1852," un tableau des chiffres du pouls relevés chez plus de 400 malades, et ce tableau aussi vient témoigner en faveur du fait d'un *seul paroxysme* dans la fièvre jaune. Voilà donc plus de six cents faits cliniques montrant la fièvre jaune comme une *fièvre continue à un seul paroxysme.*

Ces six cents faits particuliers vont plus loin; ils vont jusqu'à montrer que la fièvre jaune retient, *conserve son type continu*, même au milieu des émanations les plus concentrées du poison paludéen, et que, par conséquent, elle résiste efficacement aux sollicitations paroxysmiques les plus puissantes. En effet, New Orleans et George-Town s'élèvent au milieu de marais, et Memphis aussi, comme nous l'apprend le Dr. Saunders. "La partie basse de Memphis, appelée "Happy Hollow" est bâtie sur des terres déposées par le Mississippi "*Bottom land*" et, ce lieu est reconnu pour être le "*Hotbed*" des "affections malariales en été et en automne," c'est-à-dire que c'est une "serre-chaude" pour les semences paludéennes.

Or, au milieu de toutes ces conditions marémmatiques ou marécageuses, en Louisiane, comme à la Guiane, comme au Tennessee, la fièvre jaune est partout demeurée une *fièvre continue à un seul paroxysme.*

Dr. Faget, in speaking of the "Tableaux en lignes sur les moyennes du pouls et de température pour Memphis, New Orléans et George-Town, says:

"Ces lignes moyennes, rapprochées et *comparées*, et du pouls et de la température, laissent entrevoir ce qu'il y a de plus caractéristique dans la Fièvre jaune: pendant que *les lignes de la température se maintiennent presque horizontales*, pendant deux jours à la Nouvelle-Orleans, et jusqu'à cinq jours à Memphis, on voit *les lignes du pouls descendre dès le premier jour*, dans les deux villes, d'abord plus vite à New-Orleans qu'à Memphis, puis, à partir du troisième jour, plus vite à Memphis qu'à New-Orleans.

"Mais plus les cas sont graves, et plus on doit voir les caractères des lignes s'accentuer: c'est donc dans les cas mortels qu'ils doivent se dessiner le plus profondément. Transformons donc en *lignes* les chiffres moyens des cas mortels, nous avons précisément 10 cas suivis de mort, pour chacune de ces deux villes.

"Ces lignes moyennes des cas mortels montrent que, dans ces cas là, le *maximum* moyen 40° c., s'est soutenu pendant les 3 premiers jours à la Nouvelle-Orléans tandis qu'à Memphis il a été dépassé et même à été *en montant* pendant les 4 premiers jours, pendant ce temps, dans les deux villes, *la ligne du pouls descendait*, mais bien plus rapidement à la Nouvelle-Orleans qu'à Memphis.

"A partir du quatrième jour, on voit dans le cadre de la Nouvelle-Orleans les deux lignes présenter des *oscillations horizontales*, pendant 4 ou 5 jours. Ces *oscillations horizontales* indiquent la période des *complications mortelles* que nous avons signalées comme le présage des accidents graves. Dans le cadre de Memphis, ces *oscillations horizontales* ne sont qu'indiquées, et encore ne le sont elles que dans la ligne du pouls.

"Enfin, dans les deux cadres des cas mortels, la ligne du pouls est *ascendante* les 3 ou 4 derniers jours, pendant que celle de la température est *descendante*. Au début la *descendance des lignes avait été inverse*. De pareilles lignes sont *pathognomoniques*."

SOME REMARKS ON TREATMENT AND MEDICATION OF THE YELLOW FEVER BY DR. CHASTANT.

"Having maintained that there is no definitely known method by which Yellow Fever can be excluded, and that it may be endemic under conditions favorable to its development, or if not endemic, as believed by some, that its introduction or importation can not be controlled, it becomes our duty to mitigate the evil, and diminish its virulent and destructive agencies, by ascertaining and adopting the most successful system of medication.

Notwithstanding the ridiculous claims set up by some, of having found specific remedies or antidotes for this fever, study and experience have convinced me that it can be successfully treated, only by well directed and scientific medication. Much of the severity and of the mortality occurring during the epidemic of the year 1878, was the result of hasty, ill-advised, and injudicious self treatment, and this was more especially the case among the ignorant and uneducated class, whose patients I was called upon to attend.

Upon the appearance of the first symptoms of fever, during that epidemic, the patient was hastily ordered to bed, heavily blanketed, castor oil immediately administered; and again, in rapid succession, he was subjected to hot tea and mustard foot bath treatments. By this hasty and senseless self-practice, the action of the purgative medicine was interrupted; while at the very onset of the disease the strength and vitality of the sufferer was being reduced. I have always objected to this method before the purgative had produced its full effects. The indiscriminate use of castor oil in Yellow Fever treatment cannot be too strongly condemned, and its use should be confined to cases of children under ten years of age. Preference should be given to saline purgatives, inasmuch as the serious evacuations thereby resulting are more copious, a result far more necessary and beneficial; while through their action, the internal organs are also more speedily disengorged and the general economy is at the same time drained of its noxious excretions. A second purgative is often administered with beneficial effects in the first stage of the disease, even when the first has been attended with some action. Recourse must also be had for success in the treatment of the disease to oleaginous, and which is still better, castile soap enemas, and the like, considering them absolutely necessary. Experience and observation in the treatment of the Yellow Fever, have plainly demonstrated the inactivity and impaired state of the peristaltic motion of the whole intestinal canal, produced very likely by the specific action of the poison on its muscular fibres. Arising from this inaction, semi solid excrementitious matter, which often accumulates after the action of the purgative, may be removed by aid of these enemas, as well as the carburetted bile, equally irritating and injurious, if neglected, occasioning great nervous excitement, which might sometimes possibly be attributed to other serious causes beyond remedy. The presence and obstinate retention of these noxious matters within the bowels during the course of the fever, plainly show the importance and benefit of those enemas. While all care and attention should at this period be given to the functions and treatment of the bowels, no less care and observation should be devoted to the functions and medication of the skin; for without observance of these preliminary physiological principles, there can be no successful direction or treatment of that disease, and without them, no medicine however well known in its effect, can be of any avail, but will only result in failure and sad disappointment.

From our present knowledge of the peculiar pathological alterations occurring in Yellow Fever, the use of calomel in its treatment should be proscribed. This objection is insisted upon, because of the debilitating influence of calomel, as well as of its very great defibrinating action on the blood, an action similar to that of the fever itself.

Quinine I have found beneficial and have used it in every epidemic since 1855, notwithstanding the objections of those, who having in 1853, prescribed it in heroic doses with only fatal results, now continue their protests and will not resort to it. Administered in broken doses of 20 to 40 grains in the aggregate during the first twenty four hours, with the object not of breaking the fever, but for the purpose of neutralizing somewhat the virulence of the poison, I have found it most beneficial, the elimination of this poison, being according to my observation, apparently more actively and readily effected by the emunctories, after the quinine, than before its administration. When administered, quinine should never be given dissolved in sulphuric or other acid. In that form the patient's stomach will with difficulty retain it, and if retained, the acid, however small might be the quantity, will irritate the stomach, often provoke hiccoughs, thereby preventing the further administration of this medicine if necessary, or any other that may be required. It has been my experience that the most efficacious way of administering quinine was in its natural powder form in water, as it is more readily and rapidly absorbed through the system in that shape, than it would be in that of pills when it often happens, that even freshly made, they are not always assimilated, and pass through the intestinal canal without effect, thus occasioning a delay or loss of time in the treatment.

Among other remedies in addition to quinine, having some neutralizing effects upon the fever producing cause, I have found the following to be efficacious:—

1. Bisulphite of Soda.
2. Chlorate of Potassa.
3. Liq. Soda Chlorinata.

The latter, when necessary, to be exclusively administered in enemas. Should excessive nervous excitement occur, I have found the following medicines preferable to any narcotic preparations, which should always be avoided in the treatment of Yellow Fever, viz:

Bromide of Potassium.
Mono Bromide of Camphor.

If the patient be suffering from headache, it is well to use, and I recommend, wet compresses of Liq. Ammonia Camphorata over the forehead. In case of pains and aches in other parts of the body, frictions of chloroform liniment can be used to great advantage.

When the condition of the patient in the course of the disease has become critical, and all other medication has failed to produce favorable results, and the thermometer indicates a temperature of 104 and more degrees Fahrenheit as a last resort, one or two drachms of chlorate of potassa to six ounces of mucilage, for adults, a tablespoonful every two or three hours. This has been used with marked success.

One of the effects of chlorate of potassa whose several properties are not generally known, is to reduce the circulation, showing its sedative action. It moreover neutralizes the urea circulating through the system and consequently diminishes animal heat.

This medicine is therefore a moderator of combustion and can at the same time

be considered as antiphlogistic. Besides producing the above effects, it also accellerates the following secretions, viz: Saliva, bile, and particularly that of urea to a greater degree it is thought than nitrate of potassa.

Frictions of common Louisiana rum, used either pure or in the proportion of two parts to one of water with the hands, over the folds and articulations of the limbs, will prove without exception more beneficial than the administration of alcoholic stimulants In some cases, preference might be given to frictions with sedative water or liq. ammonia camphorata.

VERA CRUZ.

Vera Cruz, which has a population of 14,000, is situated in the nineteenth degree of north latitude, upon a sea-beach. The city is bounded on the north by the beach, on the east by the Gulf of Mexico, and on the south and west by tracts of sand and swamps. In front of the city rises the fortress of San Juan de Ulúa, and extensive reefs which stretch out on the southeast. The harbor on the Gulf of Mexico is beaten during the winter by the north winds, and while these prevail the rough sea renders communication impossible between ships and the city. According to Lerdo de Tejada Vera Cruz has undergone four changes; "The first city was founded by Cortes, April 22d, 1519, with the name of Villa Rica de Vera Cruz, on the same spot where stands the present city; the second was built near the Quiahuitzla Mountain; the third was founded by the same Cortes in 1523-4, and was on the right bank of the Antigua River, about twenty-one miles north of the first Vera Cruz; the fourth was built where it is at the present time, in 1599, by the viceroy Monte-Rey, in obedience to the orders of Philip II. (*Estudio sobre la fiebre amarilla (cómito) en la costa oriental de la República Mexicana.—Dr. Heinemann.*) All these changes were caused by the malignant fever. According to the friar—Alegre—"The yellow fever was imported for the first time to Vera Cruz in the year 1699, by an English ship which brought a cargo of slaves from Africa."—(*Dr. Heinemann*). Dr. Florencio de Camote in 1803 said: "Vera Cruz did not receive the germ of the disease from Siam, from Africa, from the Antilles, from Cartagena de Indias, nor from the United States. The germ exists in its own soil, where it remains latent till some climatic circumstance develops it."—(*Heinemann*).

In regard to the appearance of the yellow fever at Vera Cruz Lerdo de Tejada writes: "It is an unquestionable fact that the date of the first appearance of the black vomit (*el vomito*) on the shores of Vera Cruz must necessarily have been that when the concourse of foreigners from other climates was sufficient to develop the germ of this disease; hence it follows that its disappearance will be when the foreigners depart. (These foreigners alone are attacked by yellow fever.) It is now well known that the yellow fever (*vomito*) at Vera Cruz is not and never has been an epidemic, but only an endemic disease peculiar to its climate; the cause of the disease existing here it is impossible to fix the date of its first appearance, as it would be equally impossible to fix the date of its disappearance while the same cause remains."—(*Heinemann*). The yellow fever has spread to Tampico, Matamoros, Tuxpan, Frontera, Campeche and Progreso upon the coast of the Gulf of Mexico. During travels in those cities I sought information from the inhabitants, and was told that the yellow fever appeared every year during the summer in the sporadic form, but with the epidemic type only when troops were sent from Vera Cruz. At Progreso—which village is built upon the sea-shore where there are no rivers according to the opinion of the physician who visited the steamer, "the yellow fever

appears during the summer with the same symptoms as at Vera Cruz." At the same time there are a plenty of small villages where the yellow fever has never appeared, notwithstanding the fact that foreign vessels touch at those places to take on cargoes. The reason is that these vessels come directly from Europe, and afterward depart without having any communication with ports where yellow fever rages.

The germ of the yellow fever was carried by the cars to those villages which lie near the line of the railroad between Vera Cruz and the City of Mexico, and reached the City of Cordova, some miles farther on and at 2544 feet above the level of the sea. At Vera Cruz it is easy to recognize the difference which exists between the yellow and the malarial fever. In the Charity hospital, of which Dr. Garmendia was the physician, I saw that all diseases were complicated with intermittent fever, so that it was necessary to treat acute pneumonia and pleurisy by giving the patients calomel mixed with sulphate of quinine. Congestion and hypertrophy of the liver and spleen and *cachexcia palustris* were as frequent as I have seen them in the neighborhood of the worst swamps of Brazil. Dr. Mariano Olivera, physician of the fortress of San Juan de Ulúa, told me that the inhabitants of all the coast of the Gulf of Mexico used in treating yellow fever during its first and second period two ounces of castor oil mixed with a spoonful of lemon juice, followed after the purgative effects had passed off by a decoction of *palo-mulato* administered twice a day, and two clysters of salt water per day. In the period of the black vomit physicians used the symptomatic or expectant treatment.

We must mention the fact that Carnote in 1863 said: "The germ of the yellow fever is engendered (*engendrada*) at Vera Cruz," and that Humboldt in 1808, visiting the City of Vera Cruz, pointed out swamps surrounding the city as spots where the germ existed.

The genius of Carnote divined the germ of the yellow fever, and the wisdom of Humboldt pointed out the place where seventy two years later the Opunsia would be found.

HAVANA.

The City of Havana, containing two hundred thousand inhabitants, is situated in north latitude 23° 15', upon low and undulating ground. It has fine public squares and magnificent avenues, but the greater number of its streets are narrow and dirty. Havana is supplied with fresh water conveyed through iron tubes, and has sewers for the rain-water, but for the foul waters *latrinas* are employed as at New Orleans and Vera Cruz. As a city Havana is superior to New Orleans in its hotels, its markets and its theatres, but it is inferior to the latter city in its commerce.

How long since did the yellow fever first make its appearance in the Island of Cuba? This is a question which it is impossible to answer. Whether the yellow fever first appeared in Cuba and afterwards spread to Vera Cruz, Barbadoes, Cartagena and New Orleans, or whether the disease was imported to Cuba from Vera Cruz, Barbadoes, Cartagena or New Orleans, is an equally unanswerable question. The inhabitants of New Orleans and of Vera Cruz now say that every year during the summer the yellow fever is brought to those ports from Havana by steamers and sailing vessels, and the Cubans say that Havana is infected with yellow fever by importation from Vera Cruz. The truth is that the yellow fever is endemic both at Vera Cruz and Havana, taking the epidemic type now and then. The Opunsia is found in the Almendra River, which of late years has supplied the city with fresh water. At the present time this brook runs back of the Governor's Palace, and it is very easy to find the Opunsia in the canal into which this brook empties. All the cities on the Gulf of Mexico which have had commercial relations with Havana or Vera Cruz have suffered from yellow fever. It is my belief that Vera Cruz and Havana are the nests of this disease.

FIG. I.

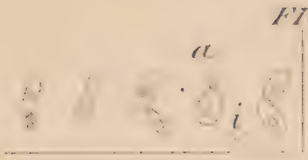
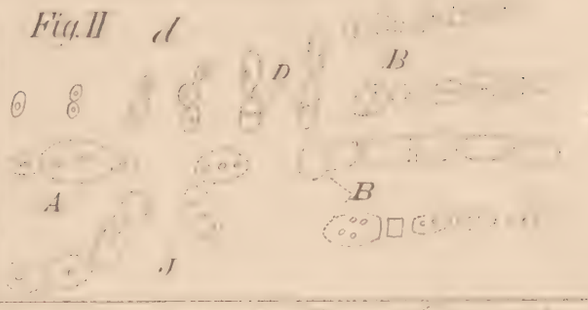
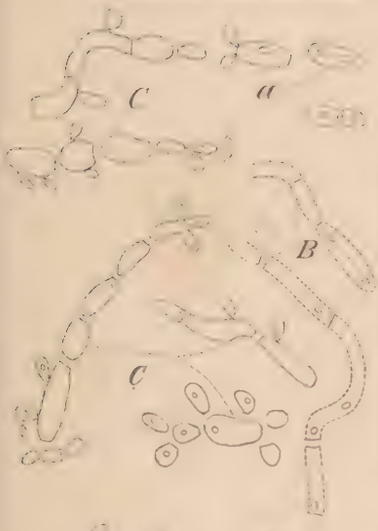


Fig. II





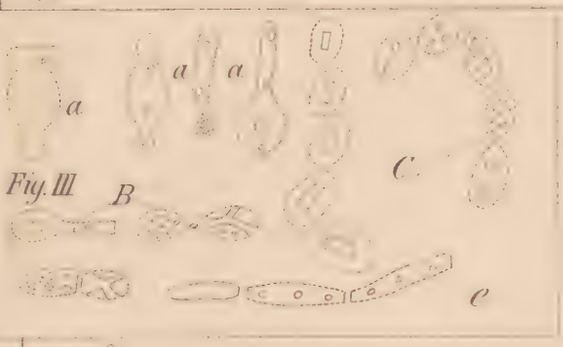


Fig. III

Fig. IV

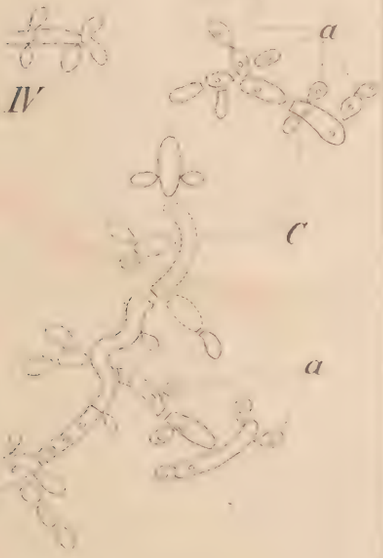


Fig. V

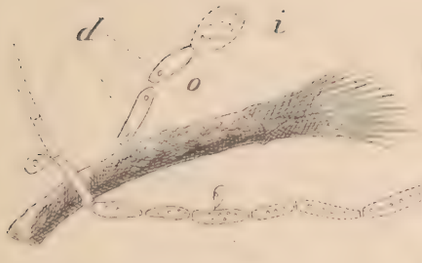


Fig. VII

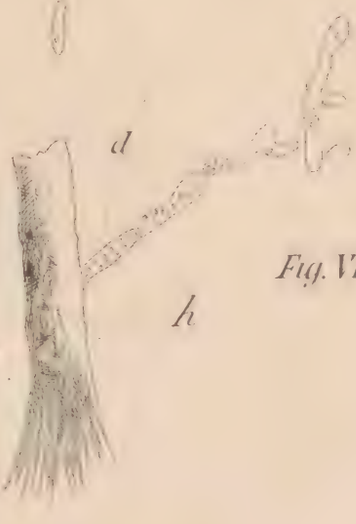


Fig. VI.

TABLE EXPLANATORY OF THE OPUNSIA.

Fig. 1 *a*, oval cells found in the black vomit and hemorrhage. *b*, oval cells segmented found in the black vomit and hemorrhage. *i* shining spots.

Fig. 2. *A*, elongated cell with shining spots. *B*, elongated cells, one segmented, the others segmented and granulated. *C*, the cells united only by filaments found in the vomit treated by alcohol and chromic and osmic acids.

Fig. 3. *a*, *a*, *a*, cells of different shape with their shining spots. *B*, primitive cells segmented and granulated. *C*, rods. (Black vomit of 1880)

Fig. 4. *a*, oval cells with their shining spots. *B*, rods. *C*, cells and rods. *g*, (text *a*) the shape of the opunsia found for the first time in the dry hemorrhage and black vomit of the yellow fever epidemic of 1880.

Fig. 5. *O*, Opunsia Mexicana found in January 1881 in the water of Jamapa River. *d*, rods. *f*, terminal cell with its shining spots. *i*, granulated terminal cell of the Opunsia. *b*, cells found in the water of a fountain of the city of Vera Cruz.

Fig. 6. *O*, Opunsia found in the Laguna de los Cocos (Vera Cruz). *d*, a ribbon of rods. *h*, a root to which the Opunsia was attached.

Fig. 7. *O*, Opunsia found in the water of the water of the Almendares River, (Havana). *i*, terminal cell granulated. *r*, sediment to which the animal was atached.

1851.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	30.1/8	27,3	23,3/8	763.	754.	752,3/4	23,3/8	21,	17,1/8	SE-18 t. NO-16. NE 7. L-4.	
February..	31.1 5/8	27,0	23,3/4	761,1/4	757,7	753,3/8	24,	21 8	19,1/8	SO-2. N-1. NO-16 m. SE-15 t. NE-14. SO-5. L 2	14
March....	29.0	26,2	22,3 1/4	763,1 3/8	759,7	755,3 3/8	23,6 3/4	21,7	17,7	ESE 1 OSO-1. ONO 1. O 1. N 1. S-1. SE-30. SO-5. S 2. NO 21. NE 10. L 1	37
April.....	29,0	26,4	24,3 3/4	760,9	758,8	755,3	24,5	21,2	19 5/8	SSE 5. LES 1. LNE 2. LNO. 1. ONO 1 SE 29 t. m. NO 25 m. NE 5. SO 2. LSE 2. LNE 1. SSE 1.	165
May... ...	28.9 3/4	22,9	20.1 1/4	766,4 3/4	761,6	754,5 3/4	19,4	17,0	13,8 3/4	SE 29 t. NO 27 m. NE-5. SO-2. SSE-3. ONO 1. LNE 1.	98
June.....	25,2	20,9	18,9	767,5	762,7	758,7	21,7	16,4	12,6 3/4	NO 30 m. SE-29 t. LSE 2. NE-1. SO-1.	28
July.....	24.8 1/4	20,8	19.9 3/4	768.1 3/4	762,3	759,7	18,1	15,7 3/4	12,6 3/4	NO-31 m. SE 30 t. O-1. NE-1. SO-1. LSE-1.	9
August....	23,3	21,4	18,7 3/4	766.0 3/4	761,9	756,2 3/4	19,1	16,7	13,7	SE-30 t. m. NO-22 m. SO. 4. NE. 6. LSE-1. LNE-1. ONO 1. OSO-1.	7
September	23.5	21,1	17.5 3/4	768,2	761,4	751,7 3/4	19.2	16,3	10,8 3/4	SE-29 t. m. NE-16 m. NO-14 m. SO-5. LNE-1.	4
October...	26,8 3/4	23,7	21,1 1/2	762,1	759,0	754,7 3/4	21,8 3/4	17,9	13,9 3/4	SE-32 t. m. NO-16 m. SO-5. NE-5.	19
November	26,8 3/4	23,7	20,2	759,8	756,8	752,8 3/4	23,5	20,3	16,8 3/4	SE-32 t. m. NO-8 m. NE-4. SO-2. LNE 1.	26
December.	30,7 3/4	24,6	21,1	761,5 3/4	758,9	754,5 3/4	25,0	20,7	15,4	SE-30 t. m. NO-15 m. NE-14. SO-5.	8
											475

1852.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever
	Max.	Med.	Min.	Max.	Med.	Med.	Max.	Med.	Min.		
January...	31 9/4	26.1	23.0	764.2	758.5	754.3	24.4/4	22.4	18.7/4	SE-29 t. m. NO-14 m. NE-9 SO-5	243
February	30.1/4	25.7	21.2	762.4/4	759.2	756.3	24 9/4	23,0	17.1	SE-27 t. m. NO-20 m. NE-1. SO-1	70
March....	30.2	27.3	22.3	762.2/4	759.8	756.6	24.6/4	23.5	21.8/4	SE-29 t. m. NO-28 m. NE-3 SO-2.	303
April....	26.8	24,8	22,8/4	767.9/4	760.1	757.4	23.0/4	21.2	18.7	SE-28 t. NO-22 m. SO-4. NE-4	403
May.....	25.6	23.2	18.3/4	766.6/4	763.1	759,4	21,8	18 8	15.4/4	SE-34 t. m. NO-27 m. NE-6 SO-1	325
June.....	24.5/4	22,0	20.2/4	766.3	763.9	761.7/4	20,9/4	17.8	15.8/4	NO-32 m. t. SE-27 NE-4 SO-2	189
July.....	24.2/4	21,5	18.4/4	766.3/4	763.2	758 2	20.2/4	17,7	13.5	NO-29 m. SE-28 t. SO-5. NE-4	93
August...	23.3/4	21,1	18.0/4	767.2/4	762.8	754.4/4	21.2/4	18.0	14,5	NO-26 m. SE-26 t. m. SO-7 NE-4.	62
September	26,8	22.2	19,3/4	767.1	761.8	756.9/4	22.7	19,1	15,4/4	SE-33 t. m. NO-31 m. NE-6 SO-2.	62
October	28.8	22.4	18.9/4	766.4/4	760.6	755,6/4	24.6	18.9	15,9/4	SE-32 t. m. NO-24 m. SE-27 t. m. NO-29 m.	37
November	28.7/4	24 9	22.3/4	762.4/4	758 2	753,8	28.8	21.4	19.0/4	NE-1	47
December	26.0	27.9	24.8/4	759.8	758.0	755.6/4	25.1/4	23.1	20.1	SE-30 t. m. NO-28 m. NE-3 SSE-1 SSO-1.	109
											1 943

1853.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	30,1⅛	26,6	22,4¾	758,45⅜	755,21	751,72	25,4⅛	22,4	19,⅛	SE-30 t. m. NO-25 m. NE-2. NNO 1.	150
February .	29,8	26,8	22,3	761,08⅛	754,75	752,31	25,6⅛	23,6	20,	SE-30 t. m. NO-25 m. NE-1. SE 29 t. m. NO 28.	176
March....	30,6⅛	25,7	22,7⅜	760,56	756,59	751,89	24,7⅜	22,3	20,	NO 27 m. SE 24 t. SO 1.	142
April.....	29,6⅛	26,5	19,8¾	759,89	756,19	751,60⅛	25,1⅛	23,1	20,4	NO 26 m. SE 21 t. SO 3.	153
May.....	26,7	22,5	20,0	760,50⅜	758,45	752,69⅜	24,4	19,5	16,7⅛	NE 3. NO 27 m. SE-26 t. NE-2.	82
June.....	23,4⅜	21,4	18,9	763,82	761,49	752,60	21,9⅜	17,6	12,5¾	NO 28 m. SE-28 t. NE 3.	73
July.....	24,2⅞	21,7	19,8	764,39	761,48	757,63	20,¾	17,1	14,3	SO 1. SSE-1. SE-19 t. m. NO-18 m. SO 8.	26
Augsut...	25,8¼	22,1	17,8⅞	762,08	758,70	752,67	19,4⅜	18,2	15,4⅜	NE 7. ONO 2. SE 24 t. m. NO-18 m.	29
September	26,3⅜	23,7	21,1	762,10	757,59	754,04	21,0⅜	19,7	18,0	NE 11. SO 3. ONO-3. S 2. SE 22 t.m. NO-11 m.t. NE 10. SO 3.	7
October.	27,4⅜	23,2	20,5	761,40	756,45	751,48	22,0	18,1	15,0¼	S 2. ONO-1. SE 28 t. m. NE-12 m. NO-6 m.	7
November	29,3⅜	25,3	22,6	760,17	755,52	751,16¾	22,	19,8	15,8	SO 3. O-1. ONO 1. SE 32 m. t. NO 14 m.	6
December.	28,3⅞	25,0	22,8⅞	759,06	755,03	750,44¼	23,⅜	20,5	17,¾	SO-6. NE-9.	2
											853

1854.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS	Deaths by Yellow Fever
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January	28,7½	25,3	20,2	758,33	756,07	751,61½	23,½	20,9	15,½	SE-30 t. m. NO-18 m. NE 11. SO-3. OSO 1	3
Februaty.	29,6½	27,3	23,9	757,90	755,79	752,15	25.	23,0	20.	SE 27 t. m. NO 24 m NE 5. SO 4.	4
March	29,0½	25,6	22,2½	760,83	757,20	752,12	25,½	21,0	17,½	SE 27 t. m. NO 29 m. NE 10. SO 8. S 4	2
April	27,8½	26,4	23,4	761,38	757,53	753,76	24½	22,5	18,0½	SE 29 t. m. NO 29 m. NE 5. SO 4. S 3. E 1. N 1	3
May	24,7½	23,1	20,4	763,94	759,32	754,19	23.	18,2	16.	SE 30 t. m. NO 27 m. NE 13 SO 4. N 1. SSE 4.	5
June	25,1½	21,9	19,6	765,76	761,29	754,87	20,0½	17,1	14,½	SE 23 t. NO 27 m. NE 6 SO 5. S 2.	...
July	23,8½	21,9	18,7½	764,55	761,80	758,67	20.	16,9	12,½	SE 27 t. NO 28 m. NE 11. SO 3	...
August	25,1	21,7	19,2½	761,58	758,76	754,05	19,½	17,4	15,½	SE 27 t. NO 24 m. NE 12. SO 9. ONO 4. ESE 1.	1
September	24,9	23,0	20,1½	762,76	758,51	752,90	21,½	18,6	14,½	SE 30 t. NO 20 m. NE 12 SO 6. S 5. ONO 1. ESE 1	1
October	27,3½	24,4	20,9½	760,64	755,97	751,14	23.	19,6	17.	SE 29 t. m. NO 27 m. t. NE 4. SO 4. S 3. O 3. ONO 2. OSO 1. E 1. N 1	1
November	28,0	24,1	21,2½	760,42	756,17	752,55	22,½	18,9	14,5	SE 28 t. m. NO 17 m. NE 14. SO 6. S 2. N 2. OSO 1. OSE 1.	1
December	27,8½	25,1	23,0	759,92	754,89	750,85	22,½	19,6	16,½	SE 29 t. m. NO 15 m. t. NE 12. SO 8. S 2.	
											21

1855.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	30,2	27.4	25,0	757.86	754 53	752,29	25,¼	21,6	18,¾	SE-26 t. m. NO-19. m. t. NE 9. ONO-1.	..
February..	30,2	27,2	24,9¾	757,96	755,67	752,34	23,	21 1	15.¾	NO-29 m. t. SE 25 t. m SO-6. NE 3. S-1.	1
March....	29.6¾	27,3	25.0¾	760,48	756,71	753,06	24.¾	22,3	21.¾	SE-31. t. m. NO 24. m. t. NE 4.	..
April.....	27,4	25,1	22,8¾	759,38	757,72	754,53¾	22,¾	19.8	17.¾	SE 28. t. m. NO 23 m. NE 5 SO 2. O-1.	..
May... ...	27,6¾	22,7	19.6	764,77	760,41	755,52¾	21,¼	17,7	14,¾	NO 29 m. SE 27 t. S-6. SO-4. O 2. L 1.	..
June.....	25,0	22,8	19,7¼	764,53¼	759,53	753,86	20,	17,6	14,¾	NO 28 m. SE 24 t NE-6. S-4. SO 3. O-1.	2
July.....	24.5	21.3	17,5	765.12	760,37	755.85	19,¾	16,5	11,¼	NO 30 m. SE-26 t. NE 9. SO 4. S 2. O 1.	..
August...	27.1	22.2	20.2	763,34	759,35	755,66¼	20,	17,9	14,¾	SE-30 m. NO-24 m. NE-13. SO-4. S-3. N 2. E-1.	..
September	24,3	22,1	17,3	762,45	759,18	756,23¾	21,	16,5	12,¾	SE-36 t. m. NO-31 m. t. NE-6. SO. 3.	..
October...	27,0	23,6	21.0	759,24	756,77	753,00	22,¼	18,9	15,¾	SE-38 t. m. NO-27 m. t. S-2. NE-6 SO 2. N-1. E-1. O-1.	..
November	27,2¼	24,2	21,8¾	757,58¾	755,08	750,37	23,¾	19,7	15,¾	SE 33 t. m. NO-17 m. NE-7. S-6. SO-3. E-2. O-2 ENE-1.	..
December.	27,8¾	24,6	20,5¾	759,64	755,96	751,68	23,¾	20,2	17,¼	SE-33 t. m. NO-18 m. t. NE-12 SO-4. E-1. S 1	..

1856.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Med.	Max.	Med.	Min.		
January...	30.2	24.6	22.0	771.06	756,47	749.11½	22.½	19.5	16.½	SE-35 t. m. NO-27 m. NE-10. SO-6	....
February.	29.7½	25.7	24.0	759.35	755.48	752.40	24.	21.4	19.½	SE-34 t. m. NO-16 m. NE-14. S-4 SO-1. O-1	1
March.....	29,3	25.4	23.2½	760,51½	754,37	746.94½	23.½	20.9	17.½	NO-29 t. m. SE-31 t m. NE-13 SO-7. E-2. S-1	4
April.....	29,0	25.7	23,5½	760.73	757,35	752,57½	22.½	20.4	18.	SE-29 t. m. NO-25 m. NE-9 SO-1. S-1. E-1.	21
May.....	26.2	22.8	20.9	765.03	758,01	750.33½	20.	17.8	12.½	NO-30 m. SE-25 t. SO-5. S-1. NE-4.	31
June.....	22.5½	20.4	18.5½	765,80	760,84	755.97½	18.	14.9	12.½	NO-28 m. SE-25 t. SO-5. E-3 NE-5 S-1	21
July.....	22.8	19,5	16,6½	767.10	762.58	758.15½	19.	14,9	10.	NO-26 m. SE-26 t. m. NE-7 SO-3. E-1. O-1.	14
August...	24.6	21.8	17.9	764.38	760,02	753.02	17.	13.8	10.	NO-27 m. SE-23 t. NE-4 S-3 O-2. OSO 1. SSO 1. SO 1.	7
September	24.5½	21.2	19.1½	765,23	760.55	753.47½	19.½	15.3	12.½	SE-23 t. m. NO-12 m. SO-6 E-5. NE-5. S-2.	2
October	25.7½	21.5	19.0	762.26	758,97	747,96	20.½	15.4	11.½	SE-21 t. m. NO-10 m. t. NE-3. SO-5 S-2. E-1. N-1	2
November	26.9	23.2	19.1½	760.78½	755.41	748.49½	22.½	16.5	12.½	SE-30 t. m. NO-13 m. NE-7. SO-1.	21
December	28.3	24.1	21.1	757.93	753,74	744.58½	22.2½	19.1	16.½	SE-27 t. m. NO-13 m. NE-5 SO-2 E-1 S-1.	43
											167

1857.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	30.0	25.8	22,9¾	758,77¾	754,76	748,97¼	23,¾	20,2	16,¼	SE-30 t. m- NO 20 m. NE-5. SO 4	139
February .	29,3	26,7	23.2¾	758,17¾	755,27	753.18¾	23.8¾	21,2	18,8¾	SE-29 t. m. NO-16 m. NE-6. SO-1.	294
March....	29.6¾	26,4	23,1¼	758,24	754,82	752,67	23.¾	20,9	17,	SE-31 t. m. NO-16 m. SO 3. S-1. O-1. NE-7.	508
April. ...	26,7	23,3	21,3¾	759,90¾	756,05	749,55¾	24,	19,6	16,¾	SE-24 t. NO-18 m. NE-10. SO-10. S-2. O-2. SSO-1. SSE-1.	284
May,.....	27,7¾	22,1	19,8	763,45	758.21	754,31	21,7¾	18,0	14,	SE-27 t. NO-25 m. SO-9. NE 5. S 4	118
June.....	26.0	21,2	18,8	764,44¼	758,75	745,43	20,	16,9	15,¾	NO 28 m. SE-27 t. SO-9. S-1.	67
July.....	25,0	22,0	18,3¾	762,82	759,10	754.42	20,	17,4	14,7¾	NO 27 m. t. SE 24 t. m. E 3. NE 9. SO 5.	27
Augsut...	25.7¼	21,4	17,0¾	765,00	759,93	754,46	20,7	16,9	12,¾	SE 27 t m. NO 19 m. t. SO-8. NE 7. S 4	9
September	26,7	22,0	18,5¾	763,06	758,58	752,99¼	20.1¾	17,9	11,9¼	SE 29 t. m. NO 15 m. NE 9. SO-8. E 1.	4
October. .	29,6	23,7	19,2¼	762,99	757,20	752,15	22,2	18,1	13,0	SE 28 t. m. NO-15 m. t. SO-9. NE-8. N-1. E 1.	6
November	30,6¼	25,4	21,3¼	760,40¾	755,61	748.18¼	23,6¾	20,6	15,1¾	SE-28 t. m. NO 13 m. NE-5. SO-3. SSE-1. SSO-1.	15
December.	30,0¾	26,3	21,4	760.18	754,59	750,18¼	24,¾	21,4	15,8¼	SE-24 t. m. NO-19 m. NE 8. SSO-5 E 2. S-1. O-1. SSE 1. SSO 1.	29
											1,500

1858.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS	Deaths by Yellow Fever.
	Max	Med	Min	Max	Med	Min	Max.	Med.	Min.		
January..	29.7½	27.2	25.3½	756.53½	752.93	750.66	25.½	22.1	18.½	SE 23 t. m. NO 22 m. t. NE 7. E 1.	
February .	28.7½	26.5	24.4½	759.74½	754.55	749.32½	24.½	21.9	16,½	SO 6. ENE 1. NNO 1. S 1 SE 22 t. m. NO 15 m. t. NE 5. SO 2	139
March	27.4½	25.3	21.2	760,08½	755,71	750.73	24.½	21,7	19.	SE 32 t. m. NO 9 m NE 9. SO 6. N 2. S 1. NNO 1 SE 24 t. m. NO 24 m. t. SO 4.	447 319
April.....	26.4½	24.2	21.1½	762,37½	756.79	750.52½	24	20.7	13.½	NE 3. S 2 SE 36 t. m. NO 28. NE 4.	133
May	24.6½	23.2	20 2	761 05	758 05	753.97½	24.	19.7	12,½	SO 3. NO 21 m. SE 19 t. SO 10. NE 8.	77
June.....	22,8½	20.8	18.9½	765,34	758,72	753,70	96,½	94.0	89,½	SSE-1. SE 26 t. m. NO 23 m. t. NE 7	27
July	23.1½	20.7	18.8	765,76	760.63	755.85	96.5	92.7	83.	SO 4. SE 22 t. m. NO 17 m. t NE 11.	18
August . .	25.1	21.3	17.6	764.01½	758.79	750.65	96.½	92.5	83.½	SO 6. SSE 2. N 1. ONO 1	2
September	23.4½	19,9	17,9	769.35½	761.87	755,67½	96.½	92,7	87,½	SE 26 t. NO 14 m. SO 5. NE 4. O 1	3
October,...	24.2	21,6	19.2½	760.65	756 42	752.18½	96.5	93.9	89.	SE 25 t. m. NO 16 m. SO 7. NE 5. SSE 1. E 1.	2
November	29.1½	23.7	19.9½	760.72½	756.57	750.93	95.	92.6	86.½	SE 25 t. m. NO 15 m. t NE 4. SSE 3. SO 4. S 3. E 1.	2
December,	29.0½	25.2	22.3½	760 16½	754.93	751.12½	96.8½	94.3	88.½	SE 26 t. m. NO 12 m. t. SSE 3. SO 2. ENO 1. SSO 1. ESE 1. S 1	6
											1966

1859.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	31.3	27.0	24.1 1/4	758.69	753.53 1/2	751.07 1/8	98. 1/4	95.8	91.5	NO 25 m.t. SE 25 t.m. NE 5. SO 3.	
February..	30. 1/4	27.6	25.5 1/2	756,46 1/2	754,36	746,21	97,	94.5	90,5	SSE 3. S 1. N 1. L 1.O 1.E 1.SSO 1. SE 26 t. m. NO 16 m. NE 5. N 1. S 1. SO 1. SSO 1. SSE-1.	30
March.....	28.8 1/8	25.6	22.1	759,05	755,07	750.13 1/2	98.5	96,6	94.6	SE 27 t. m. NO 17 m. t. SO 4. S-4. SSE 2. NE 2. ESE 1.	104
April.....	26.9	23.7	20.1 1/4	761.67 1/4	758.06	754,23	98.	95.9	90, 1/2	SE 24 t.m. NO-18 m. NE 7. S 5. SO 3 SSO 1. SSE 1. ONO-1.	126
May.....	24.7	21.8	18 0	766 31	759.86	754,15 1/2	98,1 1/2	95,3	92,5	SE 22 t. m. NO 16 m t. NE 11 m. SO 4. S 2. OSO 1.	99
June.....	24.9	21,1	17, 2	766 15 1/2	759.54	755,43	99. 1/2	81,0	90,0	NO 27 m. t. SE 24 t. m. NE 7. SO-5. S 1. SSE 1.	54
July.....	22.9	21,6	18.7 1/2	766,30	760.96	756.23 1/2	98,1 1/2	91.8	84. 1/2	SE-25. NO 20. SO-9. NE 5. SSO 1. SSE 1.	48
August...	24.2	20,5	16,8 1/2	765,99	760,32	753,70	98, 1/2	92,3	85, 1/2	NO 28 m. t. SE 20 t. m. SO 7. NE 6. SSE-5. S 4. SSO 1.	7
September	28.8 1/2	22.2	17.9 1/2	766,67	759.30	752,00	98.8 1/2	94.3	83,1 1/2	SE-19 t. SSE-17. NO 15. NE-8. SO 5. S-2. SSO 1. ONO 1.	9
October...	28.4	22.9	20.2 1/2	760.93 1/2	756.25	748,46 1/2	97,6 1/2	94.5	84. 1/2	SE-25 t. m. NO 20 m. SSE 8. S 3. NE-2. NNO-1. SSO 1. SO 1	2
November	29,1 1/2	23.6	19.8 1/2	760,48 1/2	755.91	747,53 1/2	98,8 1/2	95.4	89,3 1/2	SE-22 t m NO-20 m SSE 7. SSO 3 S 2 ESE-2. SO 2. NNO 2 NNE 1. ONO 1	5
December.	28,2	24.8	22.6 1/4	758,68	754.47	750,08 1/2	97,1 1/2	93.8	90,	SE-20 t m SSE-19 NO 11 S 5 N 2 SO 2 SSO 1 ESE-2 OSO 1 ONO 1 ENE 1	7
											17
											508

1860.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January	29.6	26.5	22.7	759.78	755.25	750.33	96.	93,57	88,	NO-22 N-8 SE-22 4 SE 19 N-NE 4 SSO-2 ONO 1 OSO-1 ESE 1.	31
February..	31,0	26,5	22.8	757.94	753,9	750.53	99.3	95,	86,	SE 20 N 8 SE 17 NO N 2 NO 11 NE 2 ONO-1, SSO 1.	113
March.....	29.5	27.8	23.2	758.07	754.61	751.27	99,	82.2	78,	NO-27 N-8 SE-25 SSE 16, S-1.	305
April.....	29.3	25.87	23.3	759.22	755.48	753.51	84.	80.3	64.	NO 26, 1 to 30. SSE 20,5 to 29. SE 10 NE-1. S-1	325
May.....	26.1	22.7	20.3	763.42	758.17	753.40	94.5	87,7	82.5	NO 26 1 to 31 SE 14 SSE 13 NE 2 [illegible]	181
June.....	25.48	22.5	20.3	761.69	757.31	754.08	98.1	93.5	89.5	NO-26 SE-16 ESE 5 SSO ESE. SSE, SO-3 E 1, NNO-1.	91
July.....	23.92	21.6	19.6	763.71	758.95	754.68	98.5	91.8	91.5	NO-31 SE-11 SSE-10 ESE-4 SSO-2 S-2 SO-1 O-1	45
August...	26.8	24.	21.2	765.53	758.53	753.21	98.1	92,6	83.5	NO 31, SE-17 SSE-10 ESE-4. E 1 NE-1 NNE-1 ENE-1	24
September	27.5	23.3	19.1	763.71	757.99	752.26	98.5	94.3	82.5	NO 26 SE 15 SSE 9 ESE 5. SSO-1 S-1 SO 1.	15
October...	28.7	24.6	20.8	763.87	756.82	749.95	98.5	95.3	69.3	SE 22 SSE 18 NO-12m ESE 7. S 3 E 3. SO. SSO. N-3 NE 3.	18
November	26.4	24.1	24.6	769.27	754.28	751.24	98.24	95.7	92.5	SE-19 SSE 13 NO 8. NE-4. SO 3 SSO 1, SO-1.	11
December.	29.8	26.5	24.1	758.08	752.07	746.98	98.84	95.2	89,84	SSE 18 NO 11, SE-11 S 5 N 3. SO, 1. ENE 1.	23
											1182

1861.	THERM. CENTGH. Max.	Med.	Min.	BAROMETER. Max.	Med.	Med.	HYGR. Max.	Med.	Min.	DIREC. OF WINDS.	Deaths by Yellow Fever.
January...	30,3⅝	28,2	24.0	758,10	753.40	745,24⅜	98,3½	95,$\frac{3}{31}$	88,5	SE-19. NO-16. SSO-13. N-4. NE-3 ESE-2. S-2. SO-1. OSO-1.	47
February.	29,6½	26,9	24.2½	757,99	753.72	749,99⅜	97.5	94,6$\frac{2}{4}$	90,1⅜	NO-17 SE-14. t SSE-14 t. SSO-2. SO-1. ONO-1 NNO-1. S-1.	68
March....	29,4⅜	26,36	24.0⅜	759,79½	754.83	750,75½	95.0	91,5	88,5	SE-20 NO-17. SSE-10. NE-3. N-3. SO-2.	47
April.....	28.9½	25.3$\frac{21}{30}$	21,9	761,62⅜	757,02	751,56⅜	99.	89,89	83,6⅜	NO-21. SE-16. SSE-13. t. ESE-2. S-2. SO-2. O-1. ONO-1. OSO-1.	33
May.....	26,5½	23,6	19,6	764,68½	757,02	752,78½	93.5	89,7	85,8½	NO-23 m. SE-15 t. SSE-14. t. SO-5. S-3. O-3. SSO-1.	25
June.....	24,8½	20,8	17,3⅜	763,23⅜	759,26	752,70⅜	92.1⅜	87,29	76,8½	NO-22 m. SSE-17. t. SE-6. SSO-4 S-4. N-4. SO-2. O 1. ONO-1.	12
July.....	23,3	20,42	17,3⅜	764,57½	761,34	757,48⅜	92.1⅜	88,91$\frac{9}{30}$	84.8½	SSE-20. t. NO-19. O-4. SE-4. N-4. SSO-3. S-3. OSO-2. ONO-1.	4
August....	24,5	22,2$\frac{19}{31}$	19,9⅜	764,01	760,58	756,82	92,5	90,1$\frac{27}{31}$	83,5	NO-19 m. SE-18 t. SSE-18. t. N-3. SSO-2. OSO 2. NNO-1. O-1.	1
September	24,7½	22,3½	19,5	763,38	757,85	753,20	94,5	91,3	87,½	SE-21 t. NO-16 SSE-12. NE-5. SO-5. SSO-4. S 3. N-1. O-1. ESE-1.	..
October...	25,9⅜	22.4	19,8	763,44½	758,43	750,60	93.1	90,4$\frac{4}{31}$	87,½	SE-21 t. SSE-10. t. SO-6. E-6. NO-8. N-5. S-4. SSO-3. ESE-1.	..
November	27,4	23,3	20,1	759,28½	754,39	747,79	93.	91,1	86,0⅜	SE-21 t. NO-11 m. SO-4. S-4. N-3 SSE-3. SSO-2 O-2. E-1.	2
December.	29,4½	24,5	20,8⅜	757,40	753,40	740,2⅜	94,1⅜	91,8	85,8½	SE-23 m. t. NO-6 m. NE-5. SO-3. SSE-3. S-3. E-2. O-1.	..
											239

1862.	THERM. CENTGR. Max	Med	Min	BAROMETER. Max	Med.	Min.	HYGR. Max.	Med.	Min.	DIREC. OF WINDS.	Deaths by Yellow Fever
January...	29,2	26,1	22,9	757.44	752.82	732,4	93.1	91,7	90,4	SE 21 m. t. NO 18 m. SSO 3. S 3. E-2. N-2. O-2.	1
February	30.1	27.8	24.0	757.35	754.05	751.07	92.3	89.9	88,	SE-19 t. NO-17 m. N-6. S-4. SO-3. O-2. E-1. SSE-2.	2
March....	28.5	26,7	24,9	756,45	754.23	751,61	93,8	91,7	88,2	SE-22 m. t. NO-15 m. SSE-6. S-4. O-0. N-3. E-1. ESE-4.	.
April. ...	26,9	24,2	22,3	760,73	756.99	751.45	93.	90,8	85,6	SE 27 t. m. NO 7. S 3. SSE 3. SSO 3. NE 2. N 3. O-1.	2
May ...	25 9	23.9	22.8	762.18	758.18	751.96	91.1	88.4	81,6	SE-29 m. t. NO-13 m. SSE 6. NE 5. SO-4. S-3. SSO 3. O 1. E-1.	..
June.....	24,6	22.8	20.1	763,96	760,88	755,72	91.	88,4	84,	SE-25. m. t. NO 10 m. NE-5. SSE 3. S-2. SSO-1. S 2. O-1.	..
July.....	23.2	20.9	17.9	766.21	760.33	751.59	93.0	89.8	86.1	SE 23 m. t. NO 13 m. S-6. SO 4. SSE 3. NE 3. N 3. O-2. SSO-1	4
August..	25,2	21.5	18.6	765.37	759.85	753.98	95.	89.	82.	SE-22 m. t. NO 12 m. SO-5. N-4. O-4. NE 2. SSE 2. S 2	..
September	29.8	23.7	18.4	763.82	759.62	752.80	95.	92.6	84,	SE 24 m. t. NO 10 m. SO-7. O-4. SSE 2. S 3. E 2. SSO-1. NE 1. OSO 1.	.
October.	27.4	24.3	21.0	769.46	758.21	746.71	94,	89.2	68,0	SE 23 t. m. NO 7 m. SSE-4. SSO 4. SO 3. O 2. NNE-1. S 1	1
November	28.8	25.3	22.0	769.01	754.24	747.79	94.0	86.1	59.	SE 23 m. t. S 6. NE 5. NO 3. SO 3. SSE 3. SSO-4. O 3. E 1.	2
December	28.3	24.9	21.6	758.43	753.18	749.41	95.	91.9	90,4	SE-20 m. t. NO-7 m. NE 6. N 2. SSE-2. SO 2. SSO-2. O-1	2
											11

1863.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	29.8⅜	28.4	25.2	755.89	752.81	750.95	94.	91,0	88.⅛	SE 26 t. NO 10 m. NE 8 m. N 4.	
February..	29.4¼	27.6	24.8½	757.74	755,29	752.48	92.1⅜	90,7	89.¾	NNE 1. SSE 1. O 1. ONO 1. NNO 1. SE 25 t. m. NO 7 m. N 6. NE 5. S 2. SSE 2. SO 2.	1
March....	28.7⅜	26.6	25.6⅜	756.77	754.02	749.65¼	94.5	93.3	91.	SE 28 t m. SO 7. N 7. NE 6. NO 8. O 1 SSE-1. SSO-1. ENE 1.	1
April.....	26.9	25.1	23.0	759.68⅜	756.13	752.95½	95.	94.0	91	SE 27tm NO 9 NE 6 SO 4 SSE 2 N 2 NNE 2 S 1 SSO 1 O 1 NNO 1 OSO 1	1
May... ...	25.7½	21.8	20.1⅛	764.49½	759.17	751.76	95.1⅜	94.5	93.¾	SE 27m. t. NO 17. NE 6. SSE 5. SO 4. O 3. SSO-2. OSO 1	2
June.....	25.5⅜	22.5	20.0	765.99	760.58	754.24½	96.	94.2	90.	SE 21 tm NO 10m SO 3 SSE 2 NE 2 NNO 2 N-2. SSO-2 NNE 1.	2
July.....	25.8	21,8	18.5⅜	766.5⅜	760,43	755,23	96,0	94,0	88.	SE 25 t m. NO 10m. NE 5. S 4. N 3. SO 3. SSE 3. SSO 3. NNE 1. O 1.	..
August....	26.4¼	21,9	18,0	769.55	760.87	755.35	97,⅛	92.4	85.½	SE 21 t. m. NO 11m. S 6 SO 6 N 3. NE 3. SSE 2. ONO 1. SSO 1. OSO 1	..
September	26,0	21,89	19,4⅜	761.78	759,03	750,12	98.⅜	94,8	84.⅓	SE 23 mt NO 11m S 7 SSE 6 NE 4 N 3. O 3. SO 2. ONO 1. ENE 1.	..
October..	26.2¾	23,1	19.7⅛	763.74	755.70	748,02½	96.5½	94,1	77.1½	SE 28 t.m. NO 9 SSE 4 N 3 NE 3 SO 2. NNE 1.	..
November	26.6⅔	23.4	19.4	760.03⅓	756.52	752.18	88.	82.2	74.⅘	SE 28 t m. NE 7. NO 5. SSE 3. SO 1. E 1. S 1.	1
December.	29.8⅔	25.2	21.6⅓	759.53⅓	753.65	749.36⅔	88.0⅓	83.6	78.8⅓	SE 23 t. m. NO 7. SSE 3. SO 6. S 3. NE 3. SSO 1. ESE 1. O 1.	3

1864.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS	Deaths by Yellow Fever
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	30.7	26.4	22.8½	756.54	753,28	749.36½	90	85.8	78.½	SE 24 t. m. NO 11 m. SSE 9m. 1 NE 6 O 3. NNE 1. N 1. SO 1.	1
February.	27.9½	26.2	23.4	757.42	754.95	752.59	88.½	81.05	58.½	SE 17 t. NO 14 m. SSE 11. NE 4. N 2. SSO-1. O 1. SO 1	2
March.	30.9½	26.2	23.7	768.60	755.29	747.09	89.½	85.4	74.½	SE 21 t. NO 17 m. SSE 10. NE 6. SO 3. E 1.	4
April.....	27.1½	23.5	20.4½	761.96	756.71	751.79½	86.½	82.08	77.	SE 19t. NO 14 m. NE 10. SSE 7. SO 5 SSO 3. S 2. N 1.	..
May.....	25.7½	22.8	20.7	764,78½	758.20	748.93½	85.½	79.5	76.	SE 23 t. NO 19 m. NE 9. SSE 6 S 2. SO 1 SSO-1. E 3 ENE 1. NNE 1	..
June ...	23.4½	21.02	18.7½	763,42½	758.50	752.63½	87.½	82.9	77.½	SE 21 t. NO-2 m. S 4. NE 4. SSE 3 SO 3. SSO-1. ESE 1.	..
July	25.7½	21.6	16.1½	764,16½	760.04	754.64½	87.½	82.7	71.½	SE 19 t. NO 16 m. SO 7. SSE 7. N 6 NE-5 S 2 E-2.	.
August...	26.0	22.2	17,8	763,51	758.18	752.71½	89.½	82.2	72.½	SE 21 t. m. NO-12m SO 5. SE 3. SSE 6 NE 16. O 1. N 1.	..
September	27.9	23,06	19,06	763,58	758.34	752.34½	84.½	81,1	74.½	SE 15. NE 12. SSE 10. SO 8. NO 6 N 3. SSO 2. S 2.	.
October..	25.2½	22.97	20.9½	759,51	756.14	751.78½	84.½	81,0	77.½	SE 15t. m. SSE-7. NE 7 SO-5. SSO 3. S 2. N-1. E 1.	..
November	27.9½	23.98	22.0	760.34	755.763	750.68½	86.½	82.1	78.	SE 23 m. 1. NE 9. NO 5. SSE 5. SO 3. S 2. N 1	..
December	28.7½	25.2	22.5½	760.34	753,58	748.52½	86.	77.7	74.	SE 29 t. m. NO 13 m. NE 8. SO 4 N 2. OSO 2. SSE 1. E-1. S-1.	.

1865.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Med.	Max.	Med.	Min.		
January..	31.1⅛	27,49	25.0	758,05	753,62	750,34	87,⅛	82,8	77,⅛	SE 29t.m. NO-10m. NE-10m N-4 O-1 SSE-1. ESE-1. S-1.	..
February.	27.3	25,35	23,4⅜	757,58	753,76	748,80⅜	84,	81,2	78,⅛	SE-24t.m. NO-13m. SO-6. NE 6. N-2. SSE-1. SSO-1. S-1.	..
March....	28,3⅛	25,3	21,1⅛	761,82⅜	755,98	751,21⅜	87,⅜	82,7	80,	SE-24 t. m. NO-15. S 5. SO-4. N-2. O-2. SSE-2. ENE-1. SSO 1. E-1.	..
April.....	25,9⅛	24,28	22,2	761,70	757,94	753,82⅜	86.⅛	83,7	78,⅜	SE-21 t m. NO-12 m. NE 8. SO-7. SSO-3. SSE-3. S-1.	..
May.....	24,7⅛	22,2	16,9	764,16	758,45	752,55	90,⅛	82,5	69,⅜	SE-15 t. NO-20 m. SSE 7. NE-6. SSO-3. S-3. NNE-1. O-1. N-1.	..
June.....	24,6	21,7	19,4	764,50⅜	760,77	755,78	89,⅛	81,8	75,⅜	SE-18 t. NO-21 m. NE-5. S-5. SO-4 SSE 3. SSO-2.	..
July.....	23,1⅛	21,0	16,6	764,72	760,93	756.24⅛	85.⅛	82,	70.⅛	NO-18 m. SE-14 t. m. NE 7. SO-6 SSE 6. SSO-3. S 3. N 1.	..
August....	26,0	21,9	18,85	764,36	759,40	754,20	87,	81,95	72,	SE-18 t. NE-11m. t. S-11. SO 5. NO-4. N-2. ENE-2. E-1. SSO-1.	..
September	24,5⅜	21,5	18,8⅛	763,371	758,37	753,56	85,1⅜	83,2	80,	SE-22. NO-9. NE 7. S-7. SO 6. N-2 OSO, O, SSO, ONO, ESE-1.	..
October...	26,8	23.6	20,2⅜	763,469	757,785	753,06	84.3⅛	81,78	77,8⅛	SE-30 t. m. NO 16 m. N-2. SO-2. E-3. SSE-1 S 2.	..
November	27,6⅜	23.42	21,7⅛	760,09⅜	756.21	750,52	88,⅜	84,3	82,0	SE-26 t.m. NE-5. SO-4. SSE-6. E-1. S 3. N-2. ESE 2. SSO 1. NNO, ENE 1	..
December.	28.6	25.9	22,1⅛	756,64⅜	752,68	747,06	89.5	87.1	83,5	SE 31t.m. NO-5. NE 3 ONO-2. SO-2 E-2. SSO-1. N-1. SSE-1.	..
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1866.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January. . .	29,61	26,6	22,6	758.83	755.42	750,95	90.	85,26	79.½	SE-29 t. m. NO 5. SO-4. N 2. NE 2. ESE-1.	
February .	28.7	26.0	22.39	759.19	754.97	752.09	92.	85.2	82.½	SE-28 t. m. N-2. SSE-2. NO-2. NE 2. E-1. SO-1. SSO-1.	
March. . . .	27.1½	24,6	21.5½	759.92	756.07	751,86	92.8½	85,99	83.½	SE-28 t. m. S-4. NE 4. NO-4. N-3. SO-3. E-2.	
April. . . .	27,1½	23,09	21,6½	762,06	757.81	752,77½	91.½	88.8	85,8½	SE-26 m. t. NO 9. E-2. SSE-2. SO-2. N-2. S-1. SSO-1.	
May.	26.45	23.37	19.2½	763.09½	758,74	754.164	92.	87,9	84.½	SE-28 m. t. NO-10 m. NE-8. E-1. ONO-1. SSE-1. S-1. SO-1. N-1.	
June. . . .	25.2	21.2	17.0	766.75½	761.55	756.07⅛	94.½	88.5	81.½	SE-24 m. t. NO-9. NE-7. SO-4. N-3. SSE-1. O-1. S-1.	
July	25,6½	21,0	17,5½	765,39½	761,72	755,70	94,½	87,6	78,½	SE-27 m. t. NO-13 m. NE-4. S-2. NNE 2. SO-1.	
August. . .	27.6½	22.7	19.5	761,218	758,05	752.61½	93.½	88,5	81.	SE-28 m. t. NO-8. SO-2. ENE-1. N-9. ONO-1. O-1. S-1.	
September	26.5	24.4	19.61½	765,783	758.80	754.97	96.7	89.2	80.	SE-28 m. t. NO-8. SO-4. S-1. NE-3. ESE-2. N-2. NNE-2. NE-2. SSO-1. SSE-1.	
October	26.8½	22.58	19,41	762.42	760,46	748,94	93.	89.2	83.	SE-30 t. m. NE-10. NO-8. SO-5. S-4. E-1. SSE-1.	1
November	28.2½	26.0	21.½	759,60	754,71	749.42	99.	89,1	84	SE-29 t. m. NE-13. NO-7. SO-5. E-2. O-1. S-1. S-1.	1
December	26.1	15.5	22.41	760.420	754,75	749.48½	98.	90.2	86.½	SE-24 t. m. NE-10. SO-5. NO-5. S-1. ENE-1. SSE-1. O-1. E-1	

1867.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	29.4	25,1	21,2⅜	759,44⅜	755.510	749,21⅛	93,⅜	89.9	85,	SE 23 t m. NO 18 m.t. NE 6.SO 2. SSE-2. S 1.	..
February..	28,5	26.1	23,2	759,990⅜	755,03	750,29⅜	91,5	88,9	85.⅜	SE 24 t, NO-14. NE-9. S 3. SSE-2. SSO-1.	..
March....	29,0	25,2	22.9⅜	763,61⅜	765,533	750,95	93,	90,1	86,	SE-19tm ESE 14 NO 10m NE 6 N 2. NNE 2. SSO 2. S 3. E 2. O 1. SO 1.	..
April.....	30,21⅜	26,3	21,2⅛	762,800	757,023	751,019⅛	93,	89,6	86	SE 17t. NE 14.NO 13 SSE-10NNE-3 N 1. SO 1. OSO 1.	..
May... ...	27,1⅛	23,3	20.3⅜	763,239⅜	757,634	747,678⅛	91,⅛	87,9	81,5	NO 17 m. SSE 14 t. SE 13 t. NE 9. N 7.O-4. S-2. SO 2. ESE 1.NNE 1	1
June.....	25,9⅛	21,9	19,8⅜	767,190	760,988	754,500	90,1⅜	85,	80,	NO-17m t NE-14 SE 14t SSE 7 SO 4 ESE 3. SSO 2. E 1. ENE 1.OSO-1	..
July.....	24,48⅛	20,8	17,5	766.094	746,95	756,056	90,⅛	86,6	80,	NO 15m. SE 14t. m. NE-12. SSE-8 ESE 2 SO 2 O 2 ENE-1 E 1 N-1 S 1	..
August....	25,5⅜	22,8	20,4⅜	764,446⅛	760.144	755,390	95,⅜	86,3	80,	SE-19t. NE-17. NO-13 SSE-8.SO 3 ESE 2. N 2. S 1. E 1.	..
September	26,0	22,5	19,5	763,780	759,863	755,450⅜	95,	87,5	80,3⅛	SE 25tmNO 10mNE 9NNE-4SSE 3 S-3. ONO-3. SO-2. E 2. SSO-2. O-1	..
October...	25,4⅜	22,4	19,5⅛	763,980	757,373	751,839⅜	92,⅜	87,1	83,5	SE 27 t.m. NE 16 m.t. SSE.8 NO-5 S-2.E 2. ESE-2.N 1.O 1.SO 1.SSO-1	..
November	26,8⅛	22,8	20,2⅛	763,973⅛	757,855	751,78⅜	92,6⅜	87,9	84,	SE-25 t. m. NO 7 m. NE 7m .SSE 6 N-3.	1
December.	29,0	25,8	22,8⅛	759.540⅜	755.119	750,360⅜	90,	87,1	82,	SE-22t m.NE-16m.t. NO 9mt.SSE 7 m.t. SO 4. S-2. ESO 1. ESE-1. N-1	1
											3

1868.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS	Deaths by Yellow Fever.
	Max	Med.	Min	Max	Med	Min	Max	Med	Min.		
January..	29.4	27.6	25.7	761,762½	758,542	7..4.79	89	87.1	84.	SE 24mt NE 9m NO 8mt SSE 4N 2 NNE 4 O-1 S-1 E-1 ESE 1 SSO 1 SE 20 t. m NE 10 m. t. NO 10 m.t.	1
February..	30,3½	27,5	24.8½	758,236½	754.708	751,517½	89.	87.1	82.	[illegible]	1
March. . ..	29,5½	27.	23.3½	761,270	756,867	752.350½	89.	84,3'	79.	SE 28 t.m. NO-18m. NE 10. SSE 4 ONO 2S 2SO-2O-1ENE 1SSO 1N 1	..
April. . . .	26.3	24.3	21.7½	762.313½	753.600	754.300	88.1½	87.2	86.5	SE 22 t m. NO 12 m. NE 7. SSE 6 SO 5. N 1 S 1	.
May.	25,8½	23.2	20.8½	762.725	758.100	752.643	88,8½	85.9	84.	NO 19 t. SE 15 m t. SSE 7. NE 4. ENE 2.SO-2 NNE 1 NNO 1 E 1 S 1	..
June. . . .	25,5½	23.1	18.0	764,6 12½	760.497	755.599½	89.6½	86.9	84.½	NO 19 m. t. NE 14. SE 12. SSE 6 SO 2. ONO-1 OSO 1.	..
July. . . .	27.1½	23.5	19.8½	763.719½	759,867	753.467	90.1½	83.9	76.9	NO 23 m t. SE 16 t.m. NE.13. SSE 5 SO 3. O 3 NNE-2. N 2 NNO 1.	1
August . . .	25.7	22.7	20.1	766,765½	760,786	755.190	89.6½	83.6	75.½	SE 23t NO 20m. NE 10 SO 4 SSE 4 S 1 E 1 NNE 1. ESE 1	.
September	27.7	23.3	17,8½	763.160	757,712	753.232½	88,1½	85.5	72.5	NO 22m. SE 21t. SSE 8 NE 4 SO 4. N-2 ONO-2 O-1 SSO 1	.
October . .	27.2½	24.1	21.3½	763.536½	757.040	751.230	86.	81.7	67.1½	SE 20t NE 13m NO-10m SSE 5 SO 3. E 2 NNE 2 SSO 2 S-1 N-1 ESE 1	1
November	29.4½	25.3	22.1½	759.074	754.929	750.540	86.6½	81.6	67.1½	SE 19m. NO 16m SSE 9 NE 5 O 2 SO 1. S 1	..
December	30.2	26.7	23.5	761,186½	754,964	746,879½	87,1	79.9	60.8½	SE 21t m. NO-10m. t. NE 10 SSE 10 SO 3 N 2 O 1 SSO 1. E 1 ONO 1 S 1	.
											4

1869.	THERM. CENTGH. Max.	THERM. CENTGH. Med.	THERM. CENTGH. Min.	BAROMETER. Max.	BAROMETER. Med.	BAROMETER. Med.	HYGR. Max.	HYGR. Med.	HYGR. Min.	DIREC. OF WINDS.	Deaths by Yellow Fever.
January...	30,3⅜	27,5	18.6	758,254½	758,825	751,020	80.	70,5	48,7⅜	SE-19tm. SO-3. NO-15m SSE-9 NE-9 E-3 S-2 ONO 1 NNE 1 O 1 N 1 NNO-1	..
February.	30,81⅜	27,1	23,0	761,170	755,069	751,090	78,⅜	73,1	59,1⅜	SE-25 t.m. NO 13 m.t. NE 9. SSE-8. SSO-3. SO-2. E-1. S-1. N-2.	..
March....	29,0	26,8	24,8	761,010½	756,771	751,570⅛	78.	74,2	61,8½	SE-29 t.m. NO-12 m. NE-11. SSE-4. ENE-1. SSO-1.	..
April.....	28,5½	25,8	23,4⅜	761,827½	757,262	753,550	79.	74,3	63,⅜	SE-24 t.m. NO-15 m. NE-9. SSE-4. SSO-4. S-2. OSO 1. O-1.	6
May.....	27,4	24,6	21,7⅜	764,500	758,725	754,230	81,1⅜	75,2	65,3½	SE-26 t. m. NO-17m. SO 8. NE-8. ESE-3. E-2. SSE-2. OSO-1. N-1.	13
June.....	26,0	24,2	20,7	762,800	758,808	753,968⅜	78,5	72,	63,8½	SE-21t. NO-20m. NE-9. SO-4. SSE-4 SSO-2. NNE-1. ONO 1. N-1.	58
July.....	26,0	22,3	16,8⅜	764,240	760,326	755,910½	79.⅜	72,9	54.½	SE-21tm NO-14m SSE 6. SO 5 NE 4S-2E-1 ONO 1 ENE 1 NNE-1 OSO 1	42
August....	24,9⅜	22,2	19,4	765,850	759,359	752,762	79,⅜	72,9	64,6⅜	SE-23tm. NO-20m. NE-6. S-6. SO-2 SSE-2. ONO-1. ENE 1. NNE-1.	33
September	23,6	22,4	20,0	764,213⅜	760,740	752,907⅜	79,1⅛	71,8	40,	SE-29tm. NO-8m. E-8 NE 5. SSE-2. SSO-1. OSO-1. ENE-1. NNO-1.	17
October...	26,5	23,2	20,11⅜	761,760⅜	756,675	751,936⅛	79,8½	72,3	60,	SE-22tm. NO-18m. SO 11. S 5. SSE 5 NE-3. N-2. E-1. ONO-1.	17
November	27,3⅜	23,9	20,6	763,230⅜	755,321	748,830	80,5	74,9	67,⅜	SE-23tm NO-8m NE 7 SSE-6 ESE-2. S-3. N 2. SSO 1. ONO 1. NNO-1	12
December.	30,2⅜	25,6	22,9	756,694⅜	753,366	747,570	80.	74,6	61,0	SE 30tm NO-16m NE 8 SO 3 OSO-3 SSE 2 N-1 S-1 ENE-1 SSO-1 NNO 1	49
											247

	THERM. CENTGR.			BAROMETER.			HYGR.				Deaths by Yellow Fever.
1870.	Max	Med.	Min.	Max	Med.	Min	Max	Med.	Min.	DIREC. OF WINDS.	
January...	30.7	27.5	23,9	758,310	754.012	751.230½	79.½	74.7	67,	SE 30 t. m. NO 22 m. NE 7. N 5. SSE 1. OSO 1. SO 1.	197
February .	31,5½	28,08	26.0	757.440	754.449	752,840	79.	72.4	65,½	SE 29 t. NO 15. m. NE 7. E 2. O 2. E ɔE 1. NNE 1.	366
March....	29.5	26,7	23.5½	758.395½	754.788	751,739	78.1⅔	73.4	66,½	SE 29 t. NO 21 m. S 5. NE 3. N 3. SO 2. O 2.	221
April. ...	28.2	25.8	22.1	761.242	756 959	753.914	79.⅔	72.4	50,3	SE 29 t. NO 20 m. NE 5. E 2 N 2. NNO 1. SSE 1 SO 1.	69
May.....	26.0	23.9	18.4½	769.562½	759.199	754.769½	77.⅔	72.8	65.0	SE 29 t. m NO 27 m. NE 4 SO 4 SSE 2 S 1 SSO 1.	91
June.....	26.5½	22,4	17.9	764.691½	760.444	757,663½	79.	70,2	55,8½	NO 30 m. SE 20 SO 4. SSO 4. N 1. S 1 NE 4	40
July	24.5⅓	20,8	17.8½	764.633	759.973	756,084½	79.1⅓	70,6	42,8½	NO 25 m. SE 22 t. NE 7 SO 4 SSE 1 SSO 1. OSO 1.	19
August...	24.1½	21,1	18.2	764.510	759.891	754,705½	78.6½	73.1	55.6½	SE 27 t. m. NO 19 m. SO 11 NE 6 S 1. ENE 1	6
September	22.9½	20,4	17.6	765,128½	759.979	754.503	81.	75,0	55,½	SE 27 t. m. NO 12 m. NE 10 SO 7 SSO 4 SSE 2 ESE 2 S 1 O 1. NNO 1	..
October..	30,9½	24.3	20,1½	763,776½	755 548	749,917½	79,½	72.6	53.8	SE 30 t. m. NO 29m t. NE 5. SSE 5 SSO 3. SO 1 N 1	..
November	28.9	23 9	20 6	761,982½	755.069	749 877½	79.6⅔	73.4	63.6½	SE 26 t. m. NE 9 NO 8. E 4. S 3 SSO 2. SO 2. N 2. SSO 2.	2
December	28 4	25.9	23.6½	757,290½	755.370	749,144½	80.8⅓	73 8	66.9½	SE 28 t. m. NO 17 m. NE 8 SSE 4 S 3. E 1. SSO 2 SSE 1.	1
											1903

1871.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	30.3 7/8	27.1	19.8 3/4	756.851	753 313	746,688	79.1 1/2	73,5	61.6 3/4	SE 29 t. m. NO-16. NE 14. S-3.	
February..	29.8 1/2	27.6	25.2 3/4	757.868 1/2	754,974	751,961 1/2	78.6 3/8	75,4	68,3/4	SO 2. SSE 2. ONO 1. ESE 1. E 1.	3
March....	28.9 1/2	26.9	24.3	761.147 1/4	754,839	750.918	79,0	75,48	68.6 3/4	SE-26 t. m. NO-16 m. NE 11 m. SO 3 t. SSO-1. S-2.	..
April.....	28.2	24.7	21,1/2	760.778 1/8	757,072	754,042 1/8	80.3 1/2	74,3	68.	SE-31 t. m. NO-20 m. NE 7 m. O 2. E 2. N-1.	..
May... ...	27.6 1/2	21.9	18.7	761.398	757,417	763,257	82.6 3/8	78,6	62.8 1/4	SE 23t. m. NO-9m. NE 8. E 5. S 4. SSE 4. O 1. SSO-1. N-1.	2
June.....	25.0 1/4	21.2	18.8 1/2	763,358	759,363	752,699 1/4	82.1 3/8	79,8	74.3 1/2	SE 25 t. m. NO-24 m. SO-13. NE 2. ONO 1. NNO 1. E-1. S 1.	..
July.....	25,7 1/4	20.2	16.5 1/4	765.838	760.000	754,233 3/4	82.7 1/2	78.3	72.5	SE 21 t. NO 19 m NE-10. E 6. S-6. SO 3. O 2. N-1.	..
August....	25.3 3/4	22.5	17.4	765.583	760.026	754,231	82,0	79.1	74.3 1/2	SE-30 t. NE-15 m. NO 16 m. SO-3. N-1.	..
September	28.8	22.5	19.2	761.909 3/4	757,318	749,735	82.3 3/8	80.2	76.2 1/2	SE 25 t. NO-22 m. NE 6. E 4. SO 4. N-3. S 3. O-2	..
October...	29.3 3/4	23.5	20.0 1/4	759,560	755,226	748,177	82,6 1/4	78,2	75,0	SE 26 t. NO 25 m. N-5. O 5. S 4. E 4. SO 4. NE 3.	..
November	29,1 1/2	23.5	18.4	759.115	754,638	750,833	79.8 3/4	78,2	76.7 1/4	NO 29 m. SE 28 t. NE 4. S-2. SO-1. E-1.	..
December.	31,1 1/4	25.7	21,6 3/4	758,863	754,469	750,367 3/4	79,5	76,9	72,1 1/4	SE-27 t. NO-26 m. N 4. O 3. S 3. E 2. NE 1.	..
										SE-27 t. NO-19 m. NE 8. SSE 1. ESE 1. N 7. E 6. O 5. S 5.	..
											5

1872.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	32,2	28.3	23,4¾	756,359	754,058	750,873½	79,1½	72,7	60.4¾	SE 29 t. NO 25 m. NE-5 m. S-3. N 2. E 2. O-2.	1
February..	32,3¼	27,7	24,3¼	755,735	752,490	748,979	80,5	77,0	59.6¼	NO 27. m. SE 25. t. NE-9. N-1. S-1 E-1. O-1. SO 1.	..
March.....	30,7¾	26,7	24,1¼	760,444	7?1,832	749,290	88,0¾	80,8	70,6½	SE-28. t, NO-27. m. NE-6. SO 3. N-1. S-1. E-1. O-1.	..
April.....	25.6½	24.0	21,6	760,955	755,394	751,653	87.6¼	85,6	83,0	NO 24. m. SE-22. t. SO 8. NE-5. S-2. N-1. O-1. SSO-1.	..
May.....	27,7	21.8	18.3¼	763.903	759,051	751,518	86,7¾	84,1¾	79,8	SE 31. t, NO-28 m. NE-5. SO-2	..
June.....	22,6	20,5	18,1¾	765.623	762.610	759,883	86.1¼	84,7	81,7¾	NO-29. m. SE 29. t. NE-3.	..
July.....	24,9¼	19,9	15,2	765,838	761,651	756.018	86,7¾	84,2	80,0	NO-28 m. SE-28 t. NE-5. N 1. S 1. E 1. O-1.	3
August. ..	25,7¾	21,9	18,2	765.388	760.651	754.694¼	86,2¾	83,3	79,1¼	NO-28 m. SE 28 t. NE 2. SO-1 N 2. S 2. E 2. O-2.	..
September	24,8½	22,4	19,3¾	761,370¼	757.932	7 5,200¾	86,3¾	84,3	81,3¾	SE-26 t. NO 23 m. NE-5 N-4 E 4 O-3 S-3 SO-1.	..
October...	29,5¾	22,5	18,8¾	762,068	758.059	752,204	86,5	84,1	78,3¾	NO-31 m. t. SE-29 t. N-2 S-2 E 2 O 2 NE-1 SO 1	..
November	28,8	24.0	20,7	758,049	754.521	752,182¾	86,6¼	84,6	81,8¾	SE 28 t. NO 23 m. NE 7 SO-1 N 2 S 2. O 2 E-2.	..
December.	31,7¾	25.9	22,3¼	757,679	753,016	748,715¾	86,7¾	83,8	78,2¾	NO 28 m. SE 28 t. NE-4. N-3 O-3. S 2. E 2. SO-1.	4

1873.	THERM. CENTGR. Max.	Med.	Min.	BAROMETER. Max.	Med.	Med.	HYGR. Max.	Med.	Min.	DIREC. OF WINDS.	Deaths by Yellow Fever.
January...	32,1¼	28,1	17.6	756,516	752,955	748,715	87,1¼	81,7	61,7¾	NO-30 m. SE-30 t. NE. 4. S-1 SO 1	864
February.	29,9¾	27,3	23,8¼	757,099	754,256	749,808	86,0	84,0	79,5	NO-27 m. SE-27 t. SO-1.	1036
March....	29,0¾	25,4	22,2¼	758,433	754,737	751,475	76,6¼	85,7	83,2	SE-31 t. NO-29 m. NE-4 SO-1.	874
April.....	29,0¼	23,8	20,9¼	761,147	757,211	751,520	86,3¾	83,7	76,6¼	NO-29 m. SE-27 t. NE-4 SO-4. ONO-1. OSO-1.	257
May.....	27,3¼	24,7	20,6¾	783,724	758,474	754,070	86,2¾	84,7	81,2¾	NO-30 m. SE-30 t. NE-4. SO-1.	171
June.....	25,1¾	21,6	19,1¼	765,083	760,352	754,641	86,3¾	83,9	81,2¾	NO-29 m. SE-28 t. NE-8. N-2. S-2. E-3. O-2. SSO-1.	80
July.....	26,2	21,6	17,3¾	764,603	759,711	756,077	86,7¼	83,9	76.1¼	NO-32 m. SE-29 t. NE-2. SO 1. S-2.	21
August....	25,6	22,2	18,2	766,150	760,904	755,990	85,8¾	82,9	80,0	NO-31 m. SE-30 t. SO-2. NE-1. E-1. S-1.	3
September	29,6¾	22,6	19,0¾	763,405	758,270	751,896	86,3¾	83,1	73,6¼	NO-32 m. SE-29 t. NE-3. SO 2. S-1.	2
October...	27,4	22.6	18,1¾	761,079	756,749	752,598	86,3¾	83,3	79,7¼	NO-31 m. SE-31 t. NE-3. SSE-3. SO-2. E-1.	5
November	29,5¼	23.4	20,7	763,746	756,359	751,071	86,1¼	82,9	76,1¼	SE-31 t. NO-29 m. SSE-7. NE-3. S-3. SO-2. E-2.	2
December.	33,8¾	25,9	20,9¾	758,070	753,903	748,098	86,0	82,2	72,5	NO-28 m. SE-28 t. SSE-2. SO-2.	12
											3337

1874.	THERM. CENTGR. Max	Med	Min	BAROMETER. Max	Med.	Min.	HYGR. Max	Med.	Min	DIREC. OF WINDS.	Deaths by Yellow Fever
January...	31,2	28,1	24,2	756,951	754,318	751,680	85,6	80,1	74,1¼	NO-31 m. SE 31 t. NE. 5. SO 1. S-1. SSE-1	14
February.	30,5	27,5	22,7	758,191	756,258	751,564	85,5	82,3	77,6¼	SE 28 t. NO 27 m. NE. 2 SO 1.	49
March ...	30,1	86,9	23,4	759,112	755,060	748,564	84,7¼	82,5	75,0	NO 32 m. t. SE 29 t. NE 1	170
April ...	31,2¾	24,6	21,2¼	762,375	757,512	752,292	84,8¼	83,0	77,3¼	NO 29 m. SE 28 t. O 2	293
May......	25,6¼	21,7	17,6¼	765,107	758,013	750,880	84,1¼	88,98	11,99	NO 33 m. t. SE 29 t. SO 2. SSE 1 N 1	160
June.....	25,0	20,5	17,8	764,585	759,224	756,739	18,7	13,26	10,02	NO 31 m. t. SE 24 SO 8. OSO 2 NE 1. ONO-1. O 1	67
July ...	21,73	20,2	17,1	767,421	761,090	755,845	16,0	12,84	10,30	NO 30 m. SE 28 t. NE 2. SO 1. E 1	28
August...	24,1	20,6	16,2	768,675	762,754	757,022	14,77	12,52	10,61	NO 31 m. SE 31 t. SSE 3. SO 1.	5
September	26,9¼	22,3	19,2	764,042	759,575	750,509	16,25	13,65	10,99	NO 30 m. SE 29 t. SSE 4. ONO-1. SO-1	4
October...	28,7¼	22,7	20,3	761,508	755,934	751,998	18,20	16,43	12,44	NO 28 m. SE 26 t. SSE-10 OSO 2. SO-2	6
November	[illegible]	22,0	18,8¼	760,756	[illegible]	[illegible]	18,75	15,78	10,97	NO-27 m. SE 16 t. SO-9. SSE 4. SO-8. S 2. NE-1 N-1.	8
December	[illegible]	[illegible]	19,7	761,088	[illegible]	756,003	26,71	17,78	10,00	NO-21 m. SE-20 t. SO-11. SSE 6 S 3. NE 2. ESE-1. SSO-1	16
											814

1875.	THERM. CENTGE.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
January...	31.3	26.4	22.7½	756.239	753.274	747,429½	23.61	20.28	17,54½	NO.38 m. 4. SE-28 4. SSE.8. SO-5.	12
February..	31.6½	26.8	22.1½	758,730	755,556	751,784	23.07	19.53	15.74	NO.28 m. SE-19 4. m. 8SE.7. SO.6.	144
March...	28,0	24.4	20.7½	760,166	755,681	751,155	21.27½	18,66	16,87½	NO.22 m. E-11. SE.23. SO-5. S-5. O-3. N.2. SE.2.	385
April.....	26,7½	24.2	20,0½	762,142	757,180	752,272	19.48	16,95	14.10	NO.20 m. SE.20 4. SO.12. SSE.2.	229
May.. ..	24.2	21.8	19,8	763,125	759,113	753,202	18.01	16.06	14,66½	NO.31. SE.20. SO.13. O.4. SSE-2.	240
June.	21.5	19,5	15,5½	765,981	759,532	754,581	17.97½	14,65	11,05	NO.34 m. 4. SE-25 4. SO.5. NE.9. SSE.4.	104
July.....	24,0	18.3	10,5	768,858	762,366	756,291	16,54	13,96	11,51½	NO.28 m. SE.24 4. SO.11. NE.4. OSO.2.	94
August...	25.1½	19.8	16,0½	763,855	763,300	757,378½	17.75	14.99	12,03½	NO.28 m. SO.29 4. SO.9. SSE-5.	19
September	28.3½	24.7½	17.2	765,318	760,403	756,905½	18.13	14.49	11,41	SO.3 m. SE.28 4. SSE.12. SO.8.	5
October..	24.0	21.8	17.8½	762,899	757,304	749,487	21.88½	15.49	12.33¾	NO.28. SSE.20 4. SE.20. SO.20. S-2. ONO.1.	3
November	30,0	22,0	19,7	762,715	755,893	748,963	20,72½	16,31	12.81½	NO.30 m. 28.21. SE.14. SO.5. S.2. ONO-1. N.1. E.1. O-4.	2
December.	31.2	26.9	21,5	760,757	755,374	752,048	21.64½	18,71	14.82	NO.30 m. SSE.25 t. SE.11. OSE.1. NNE-1. SO-4.	9

	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS	Deaths by Yellow Fever
1876.	Max.	Med.	Min.	Max	Med.	Min.	Max	Med.	Min.		
January...	32.9½	27.4	22.0½	757,410	754,545	751,523	21,06	18.64	14.89½	NO 29 m. SSE 24 t. SE 11 t. N-1. OSO-1 NNO-1 ONO-1.	120
February..	30.0½	26.3¾	22.9½	757,781	754,246	751,880	20.42¾	19.63	16,50	NO 30 m. t. SSE-24 t. SE 8. S 3.	318
March.....	32.3¾	26.5	23.2	758,614	754,964	751,054	21,32	18,39	15,83	NO 28 m. SSE 22 t. SE-6. N 5 SO 3.	1322
April.....	27.2½	24.1	21,7¼	760,712	757,177	754,401	18.82¾	15,82	13.38	NO 27 m. SSE 21 t. SE-8. N-5. SO 1. S-1.	936
May.....	24.4½	22.2	19.5¾	763,886	759,133	753,023	17,54½	15,18	13,12	NO 21 m. SSE 19 t. SE-8. N-5 NE 4. SO 1. S 1.	376
June.....	24.5	20.4	18.0	766,392	762,039	756,744½	16,23	14,47	12,47	NO 17 m. SSE 17 t. SE-12 t. N 5 m. SO 2 NE 1. S-1	132
July.....	22.3¾	20.1	17.5	764,928	761,530	757,659	15,15¾	13.57	10,22	NO 26 m. SSE 19 t. SE-7. N 3. SO-2. SSO 2.	43
August. ..	26.4	20,5	15,8	765,816	761,003	753,918	17,30	16,66	10,25	NO 22 m. SSE 16 t. N 10. SE 8. SO 7.	12
September	26.0	21.5	18.5¾	763,927	758,580	754,546	16,85	14,59	12,17	NO 24 m. SSE 16 t. SE 11. SSO 4 N 2. SO 2.	4
October..	28.2	22,3	17.6	762,748	758,342	753,489	20,35	15,29	10,75	NO 26 m. SSE 24 t. SSO 19 m. t. S-3 SE 2.	5
November	29.4	22,7	19,1½	760,881	754,818	749,852	19,96	15,88	11,86	NO 27 m. SSE 22 t. SSO 8. SE 1.	4
December	31.0½	24.7	19.4	761,127	755,323	750,750	19,99	17.03	13.67	NO 27 m. SSE–19 t. SSO-6. SE 4. ONO-2. N-2. NE 1.	2
											3274

YEAR.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Med.	Max.	Med.	Min.		
1851	30,7	23,8	17.5	768,2	759,4	751,7	18,1	18,8	10,8	SE-333NO-241 NE-88SO-39S-3ONO-4OSO 2N 2 O-1 SSE-1ESE-1 L-7 LSE-14LES 1LNE-7LNO-1	475
1852	36,0	24,0	18,0	767,2	760,7	754,3	28,8	20,4	13,5	SE-350. NO-301. NE-45. SO-29. SSO-1. SSE-1.	1943
1853	30,6	24,2	17,8	764,39	757,28	750,44	25,6	20,1	12,5	SE-287. NO-226. NE-58. SO-28. S-4. ONO-7. O-1. SSO-1. SSE-1. NNO-1.	853
1854	29,6	24,1	18,7	765,76	757,76	750,85	25,0	19,4	12,0	SE-336. NO-267. NE-112. SO-55. S-20. ONO-4. OSO-3. N-5. E-2. O-3. ESE-2. SSE-1. OSE-1	21
1855	30,2	24,2	17,3	765,12	757,60	750,37	25,0	18,9	11,	SE-357. NO-299. NE-80. ONO-1. SO-35. S-25. O-10. L-1. N-3. E-5. ENE-1.	3
1856	30,2	22,9	16,6	771,06	757,64	744,58	24,0	17,4	10,0	SE-329. NO-248. NE-86. SO-44. S-16. O-4. E-14. OSO-1. SSO-1. N-1.	167
1857	30,6	23,8	17,0	765,00	756,90	745,43	24,0	19,0	11.9	SE-328. NO-222. NE-79. SO.74. S-13. O-4. E-7. SSO-3. SSE-3. N-1.	1500
1858	29,7	23,3	17,6	769,35	757,16	749,32	96,5	63,2	12,	SE 300. NO-217. NE-67E-2SO-56ENE-1NNO-2N-3. S-7. SSE-10. SSO-1. ONO-1O-1L-2ENO 1. ESE-1	1166
1859	31,3	23,5	16,8	766,67	757,30	746,21	99,	93,4	10,0	SE 279. NO-236. NE 58 SO 46. SSE 65. S-30. SSO-11. E-1. ESE-5. ENE-1. N 4. NNO 3. NNE-1. O-1. OSO-2. ONO 4. L 1.	508
1860	31,0	24.5	19,1	765,53	756,11	746,98	99,3	91,25	64,	SE-207NO-258SSE-162NE-17 E-7 SSO-13 ONO-3 ESE-31. OSO-2. NNO-4. S 15. SO-15. O-1. NNE-1. ENE 2. N-4. L-1.	1182
1861	30,3	23,85	17,3	764,68	756,60	740,2	99,	90,96	76,8	SE-198. NO-196. SSO-34. NE-20. ESE-6. S-29SO-31 OSO-6. SSE-134. NNO-2. N-32. O-14. ONO 3. E-9.	239
1862	39,8	24,2	17,9	766,21	756,88	732,4	95,	89,9	63,0	SE 291 NO-130 SSO-22 NE-29 ESE-1 S-38SO-31 SSE 38. E-9. OSO-1. N-22. O-23. NNE-1.	11
1863	29,8	24,5	18,0	769,55	757,01	748,02	98,	91,5	74,	SE-303NO-114NE-58SSE-43N-33SO-36S-24SSO-15O9 NNE6 NNO5 ONO3 OSO3 E1 ENE2 ESE1	12
1864	30,9	25,5	16,1	768,60	756,58	747,09	90,	82,2	58,	SE-247NO-129NE-90SSE-82SO-45S-20N-18SSO-11O-5. E-8. NNE-2. ENE-2O. SO-2. ESE-1.	7

YEAR.	THERM. CENTGR.			BAROMETER.			HYGR.			DIREC. OF WINDS.	Deaths by Yellow Fever.
	Max.	Med.	Min.	Max.	Med.	Min.	Max.	Med.	Min.		
1865	31,1	23,6	16,6	764,72	757,15	747,06	90,	82,9	69,2	SE-272NO-143NE-95SO-46S-42SSE-31N-19SSO-17 E-8O-5ESE-4ENE-4NNE-1OSO-1ONO.1NNO-1.	0
1866	30,1	23,8	17,0	766,75	757,51	742,48	96,5	88,0	78,	SE-315. NO-86. NE-64. SO 35. N 25. S-17. E-11. SSE-8. SSO-7. ESE-6. O-5. NNE-5. ENE 3. ONO 3.	2
1867	30,2	23.8	17,5	767,190	757,418	747,678	95,	87,8	80,0	SE-242. NO-148. NE-135. S-75. E-9. ESE 25. SO-22. N-18. NNE-10. O 9. SSO-8ONO-3 ENE-2OSO-2ESO-1	3
1868	30,3	24.8	17,8	766,765	753,120	746,830	90,1	84,4	60,8	SE.241 NO 182 NE-109 SSE-65 SO-39 S-13 N-11 O-9 ONO-8SSO-7NNE-7E 6ENE-4NNO-3ESE-3OSO-1	4
1869	30,81	24,6	16,8	765,850	757,613	747,570	81,1	73,2	40,	SE292 NO176 SO38 SSE54 NE88 E19 S19 NNE4O2 ONO-7 SSO-13 N-8 ENE 5 OSO-7 ESE-5 NNO 3.	247
1870	30,9	24,2	17,6	769,562	756,242	749,144	81,0	72,7	42,8	SE322 NO236 NE75 N14 SSE18 OSO1 SO37 E9 O5 ENE-2 NNE 1 S 15 NNO-1 SSO-17 ONO-2 ESE-3	1003
1871	31,1	23,9	16 5	765.838	756,554	746,688	82,7	72,3	61,6	SE-319. NO-241. NE-89. SSE-7. SSO-2. SO-33. S-33 ESE-2. E-32. N-23. NNO-1. ONO-2. O-20.	5
1872	32,3	23,8	15,2	765,838	757,022	748,715	88,0	82,4	59,6	SE-331. NO-321. NE-57. N-19. SSO-1. SO-19. S-19 E-17. O-18.	8
1873	33,8	24,1	17,3	783,724	756,990	748,098	87,1	83,5	61,7	SE-351. NO-357. NE-36. SO-19. S-10. SSO-1. SSE-12 ONO-1. O-2. OSO-1. N-2. E-7.	3337
1874	33,4	28,4	16,2	768,675	757,656	746,739	85,6	18,65	10,02	SE-329. NO-350. NE-14. SO-45. S-5. SSO-1. SSE-29. ESE-1. E-1. OSO-4. ONO-2. N-3. O 3.	814
1875	31,6	22,7	15,55	768,878	757,935	747,429	23,61	16,65	11,05	SE-269. NO 364. SSE 112. O-6. SO-101. S-9. N-3. NE-2 OSO-2. E-1. ONO-1. SES-22. NNE-1.	1166
1876	32,9	23,2	15,8	766,392	757,641	749,852	29,42	16,26	10,22	SE-76. NO-303. SSE-243. SSO-30. N-41. SO-18. NE-6. S-6. ONO-3. NNO-1. OSO-1.	3274
26 years	39,8 (1862)	24,8	15,6 (1872)	783,724 (1873)	757,816	732,4 (1862)	99,3 (1860)	79,72 16 years 18,55 10 years	40, (1869)	From 1851 to 1876 17,940 persons died by Yellow Fever.	